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To EDWIN A. START

Secretary American Forestry Association

1410 H Street N. W., Washington, D. C.

Dear Sir: I hereby signify my desire to become a member of the American Forestry Association. One dollar (\$1.00) for annual dues is enclosed herewith.

Very truly yours,

Name _____

P. O. Address _____



Photo by Herbert W. Gleason

TUEULALA FALLS, HETCH-HETCHY VALLEY

View from across the river, Wapama Falls just showing at the right

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No. 6

A FORWARD STEP IN FOREST CONSERVATION

By WM. L. HALL

In Charge Branch of Products, Forest Service

AN ADVANCE in forest conservation is realized in the establishment at Madison, Wis., of a thoroughly equipped wood-testing laboratory. Established on a cooperative basis by the Forest Service and the University of Wisconsin, the laboratory will be formally opened on June 4 with appropriate exercises. The presence of representatives of the lumber industry and of practically all the wood-consuming industries will make the occasion an auspicious event.

What is the need of such a laboratory? Of what value will its work be that it should be assigned an important place in the program for forest conservation?

Since the report of the National Conservation Commission we have had better information than ever before on the waste that occurs in harvesting the forest and in using its products. It was shown that so far as the tree is cut up into sawn products the waste is about two-thirds, if the bark and small branches be included. Let us look a little into the detail of this matter. It is important.

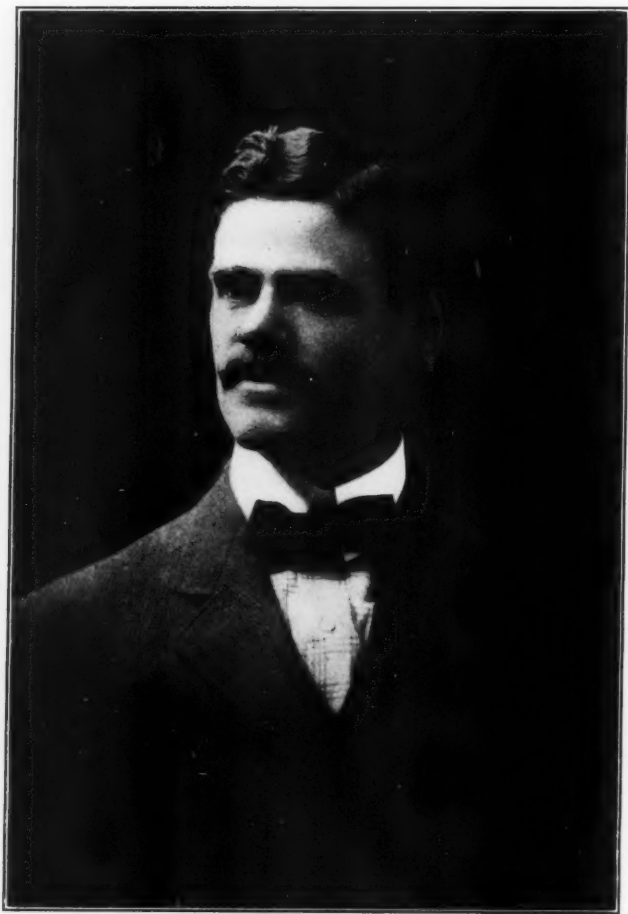
The wood which we cut down in the forest each year, if compacted together, would form a solid cube one-half mile square. It is taken from the forest by many industries. The lumber industry

takes forty-two per cent, cordwood thirty-two per cent, fence posts nine per cent, hewed railroad ties seven per cent, cooperage and pulpwood each two per cent. In manufacturing sawn lumber and its use by the industries, about sixty-seven per cent of the wood which grew in the tree is lost. In cordwood the loss is as low as five per cent, and in posts and rails it is only twenty per cent. In hewed cross-ties, however, the waste runs to seventy per cent, none of which can be used; and in cooperage stock waste reaches the enormous figure of seventy-eight per cent. Taking these several items which together take ninety-four per cent of the wood in the forest, we find that their combined waste amounts to thirty-eight per cent of the total. It is apparent, then, that considering the total amount of wood used, the waste approximates forty per cent, or two-fifths.

To aid in saving this vast waste is the work of one entire branch of the Forest Service, the Branch of Products, and it is the direct purpose of the Forest Products Laboratory.

PREVIOUS TESTS HAVE BEEN USEFUL

Now, the value of laboratory work in the economical use of wood has already been fully tested by the Forest



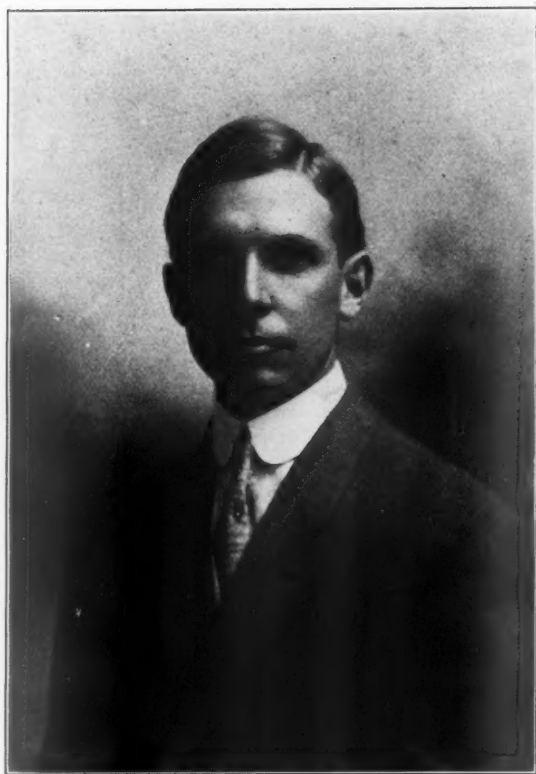
WILLIAM L. HALL

Assistant Forester, United States Forest Service, in charge of the Branch
of Products, Madison, Wisconsin

Service. For several years small timber-testing laboratories have been conducted in cooperation with Yale and Purdue universities and the universities of California, Colorado, and Washington. Some excellent results have been obtained in determining the strength and other properties of our commercial woods. Wood-using industries and engineers have profited by the information thus obtained, and the tests of the

Forest Service now form the basis of the specifications used in several important industries.

Confined as it was to timber testing, the work of these laboratories was too much restricted to yield the most important results. Facilities were needed for chemical studies, for wood-fiber investigations, for experiments in preservative treatment of wood, but none existed.



McGARVEY CLINE

Director of Forest Products Laboratory, United States Forest Service, Madison, Wisconsin

It is now five years since the first steps were taken to provide a laboratory in which all the necessary investigations involved in the use of wood could be made. An appropriation was requested from Congress, but was not secured. An attempt was made to lease a suitable building in Washington, but one could not be located. Contractors were found who were willing to erect a building such as was desired, but because a long-time lease could not be made, and because a building of the kind desired if vacated for its original purpose could be used for but little else, the proposed lease rate was so high as to make the project impracticable.

After considering many possibilities, we at last hit upon the idea of enlisting the aid of a university to secure the needed facilities. The matter was presented to several prominent institutions situated in the region within which it was considered advisable to locate the laboratory. Nearly all became interested at once, and three of them responded with very attractive propositions. These were the state universities of Michigan, Wisconsin and Minnesota. Not only were their propositions good, they became very eager to secure the prize. State pride was aroused. To decide between them was no easy matter. After careful and full consideration, the University of Wisconsin was



H. S. BRISTOL

Assistant Director of Forest Products Laboratory, United States Forest Service, Madison, Wisconsin

selected as having made an entirely satisfactory proposition and as presenting on the whole the most favorable conditions for work such as the Forest Service intended to do.

By the terms of the agreement which was entered into, the University has erected a building at a cost of about \$50,000, and will supply free of charge the heat, light, water, and power required in the work. The Forest Service has supplied the testing machines and other apparatus and will furnish the force of forty experts and assistants to carry on the work. By this plan of cooperation the United States secures the largest and most completely equipped wood-testing laboratory in the world.

ORGANIZATION BY SECTIONS

As to organization and working space, the laboratory is divided into three groups of three sections each. The first

group employs processes that are largely chemical and may be designated the chemical group. In it are the sections of chemistry, pulp, and distillation. The section of chemistry devotes itself to the study of the chemical constituents of wood and the composition of wood preservatives. The section of pulp investigations studies the fiber characteristics of woods to determine their value for various classes of pulp. The immediate work of his section, for which Congress has made a special appropriation, is to determine whether it is possible to find a substitute for spruce in the manufacture of ground wood pulp. The section of distillation has the interesting and important field of developing chemical by-products of wood by distillation processes. Undoubtedly, this section is to have great direct importance in reducing wood waste because many of our commercial woods are rich in such materials as alcohol, turpentine, oils, and gums.



H. S. SACKETT

Chief, Office of Wood Utilization, United States Forest Service, Chicago, Illinois

The second group of sections may properly be called the physical group, and contains the sections of wood preservation, pathology, and wood physics. Wood preservation covers the study of the treatment of wood by substances to improve its durability or appearance. The treatment of wood to improve its durability is rapidly becoming an important industry, and in the future it will work a great reduction in the waste which takes place in use because of decay, insects, and marine borers. Many of its fundamental problems are yet to be solved, however, and on these the laboratory will work. Closely allied with wood preservation is the section of pathology, which studies the diseases which prey upon woods. By an

advantageous cooperative arrangement part of its work. The section of wood physics will investigate the microscopic the Bureau of Plant Industry will manage this section and supervise the technical structure of wood and the relation between structure and physical properties such as strength, toughness, and penetrability to liquids.

The third group contains two sections, which rest substantially on mechanical engineering. It may, therefore, be called the engineering group. The first of these is timber testing, which aims to build up, through mechanical tests, a rating table for the properties of our commercial woods. By means of the figures, when secured, we may classify woods according to

their relative value for specific purposes. The second section is that of engineering, and has to do mainly with design work. Whatever is accomplished in cutting down wood waste in any line will depend in great part upon the efficiency of the machines which will be designed to do the work. This section is consequently a very important one. Third in this group is the section of maintenance, which looks out for the general maintenance and unimpeded operation of the laboratory.

Each section is in charge of a trained man who has under him the necessary assistants. Over all the sections, and in charge of the laboratory is the director, Mr. McGarvey Cline. He has as assistant directors Mr. H. F. Weiss and Dr. H. S. Bristol.

OTHER WORK OF THE BRANCH OF PRODUCTS

Correlated with the Forest Products Laboratory is the Office of Wood Utilization, with headquarters in Chicago. Its work is statistical, while the work of the laboratory is altogether experimental. The Office of Wood Utilization makes no tests, but is constantly gathering facts and figures which will promote economy in the use of wood. It makes studies of the wood-using industries of cities and states, learns their requirements, and aids them in finding supplies of cheap and abundant woods to take the place of scarce and costly ones. It finds out what the waste is and proposes methods for its reduction. It is also gathering a record of wholesale lumber prices at the mills and in the principal distributing markets. These are base lines run through the lumber industry, by which prices in one region or market may be compared with those in another, and by which may be determined in a broad way what influences operate to raise, lower, or hold steady the prices of lumber. This is a good thing, both for the public and the lumber industry. In charge of the Office of Wood Utilization is Mr. H. S. Sackett, with offices in the Fisher Building, Chicago.

The laboratory and the Office of Wood Utilization are represented by branch offices in Washington, Denver, San Francisco, and Portland, Oreg. These carry on the work in certain districts. The office which has administrative charge of all the several lines of work, already mentioned as the Branch of Products, has hitherto been in Washington, but on June 1 was transferred to Madison, from which place the assistant forester in charge will report to the forester in Washington.

All work conducted by the Branch of Products is done in close contact and cooperation with the lumbering and wood-using industries. It aims for practical ends which are linked with the processes of those industries and which can only be accomplished through the improvement of their processes. Consequently, it must keep in close touch with the industries to succeed at all, even in a minor degree. The industries do not resent this policy, but appreciate and favor it. They are anxious to see its objects accomplished. As an expression of their spirit in the matter, let me quote a part of a resolution adopted by the National Lumber Manufacturers' Association at its meeting held in New Orleans in April of this year:

"And, further, since the elimination of waste is as truly conservation as the growing of trees, we heartily approve the efforts of the government, through the Forest Service, to develop methods whereby material now wasted may be put to use, or for prolonging the life of forest products, and urge a continuation of such research and a liberal appropriation by the government for their support."

With this sort of spirit prevailing among the industries which are mainly concerned and with facilities such as are afforded by the new laboratory, it may be expected that valuable results will be accomplished. It is the determination of those who make up the working force that the great opportunity which is presented shall be improved to the fullest extent for useful work.



SEEING THE GERMAN FORESTS

En route to Trippstadt to see American white pine forests 120 years old

FORTY-FIVE AMERICANS IN THE FORESTS OF GERMANY

By HOWARD R. KRINBILL

GERMANY, the foremost military power and the third naval power of the world, has been invaded by forty-five Americans. During the past winter, the forests of the kingdoms of Prussia and Bavaria and Wurttemberg and the grand duchies of Baden and Hessen have been penetrated by these young men, sons of American lumbermen and forest owners, students of the Biltmore Forest School, in winter quarters at Darmstadt, Germany.

Few Americans realize the advantages to be secured in Germany by the forestry student. No musician underestimates the value of a study trip to the land of Handel, Mozart, Beethoven, Weber, Meyerbeer, and Mendelssohn. No artist hesitates to visit the home of Dürer and Holbein. No architect slightes an opportunity to behold Co-

logne. No student of German considers his time wasted in the land of Lessing, Schiller, and Goethe. Similarly, the forestry student is attracted to German soil because it became the birthplace of forestry a century ago through the pioneer foresters Hartig, Cotta, and Hundeshagen.

To-day, the German forests are managed under the most highly developed system of scientific forestry in the world. The aim of the students of the Biltmore Forest School, however, is not to introduce any innovations upon their return, since the perfect German forestry system is no more suitable for the exploitation of the vast areas of American timber than American lumbering methods are applicable to the communal forests of Germany. The world's best working field for scientific studies in



AMERICAN WHITE PINE

One hundred and twenty years old, 33 inches diameter, Trippstadt, Germany

forestry is found in central and southern Germany, but for practical work in timber cruising, road, bridge, and railroad building, logging and milling, the Southern Appalachians and the forests of the Lake States of the United States form desirable working fields. The Biltmore Forest School is seeking these different sites adapted to the study of each branch of forestry, having a new working field each season of the year—winter, Germany; spring, Adirondacks,

and Southern Appalachians in North Carolina; summer, Tennessee; fall, Wisconsin and Michigan.

The excursion to Germany affords a chance for scientific study along the following lines:

1. Forest management, varying according to ownership (state, communal, and private), and according to type—pineries of the Rhine Valley, primeval white oak of the Spessart Mountains, hardwoods of the Odenwald, and spruce and silver fir of the Black Forest.
2. Silviculture—nurseries, reforestation, underplanting, thinnings.
3. The classification and distribution of the forest trees of the United States. *GERMANY has the world's best experimental plots of American forest trees and the world's oldest forest plantations of a variety of American trees, notably of white pine, Douglas fir, sequoia, western yellow pine, Port Oxford cedar, yellow cedar, western red cedar, Sitka spruce, and white fir.*
4. Botanical studies under Dr. Heinrich Schenck, president of the Darmstadt Technical University, editor of "Strassburger's Botany."
5. Forest protection, particularly against fires and insects.
6. Timber preservation—creosoting railroad ties and kyanizing poles.
7. Utilization of forest products with minimum waste at sawmills and veneer and furniture factories.

8. Forest economics; a study of the conditions, economic, social, and political, under which conservative forestry is more remunerative than destructive forestry.

9. Fish and game course, supplemented by visits to the hatcheries at Baden-Baden and the zoological gardens and museums at Frankfurt and Darmstadt.

10. American export lumber trade with Germany.

The achievement of seeing the best forests in Germany in only four months has been due primarily to the leadership of Dr. C. A. Schenck, who studied at the German universities twenty years ago, became familiar with German forestry under Doctor Brandis, acted as forester to the 125,000-acre Biltmore estate in North Carolina fourteen years, founded the first American forestry school twelve years ago, and now holds the honorary rank of Oberfoerster in Hesse Darmstadt.

The local German foresters have been glad to guide the Americans and explain the history and management of their districts. The experience of a score of the best foresters in Germany has been at the disposal of the school. The German forester knows not only his native species, but also the trees of the world, particularly those of the United States. To illustrate this fact, a brief description of some of the stands of American white pine visited by the Americans is given below:



AMERICAN WHITE PINE

One hundred and twenty years old, Trippstadt, Germany

1. In Rhenish Bavaria, in the Trippstadt forest, near Kaiserslautern, the white pine was introduced 120 years ago. To-day white pine standards twenty inches to thirty-three inches in diameter, breast-high, are found with a prolific second growth. The illustrations (Nos. 1, 2, and 3) show the high quality of these standards, as well as the thriftiness of natural reproduction. The price obtained for the White pine in the log varies from \$12.50 to \$49 per 1,000 board-feet, according to size.



AMERICAN WHITE PINE

One hundred and twenty years old; natural seed regeneration; Trippstadt, Germany

The stumpage price of White pine is higher than that of any of the native species, as shown by the price schedule below:

	Diameter at middle of log, inside the bark				
	Less				
	20"-24"	16"-20"	12"-16"	10"-12"	than 10"
White Pine, per M.....	\$49.00	\$37.00	\$30.50	\$21.50	\$12.50
Scotch Pine, per M.....	26.00	23.00	22.00	18.00	14.00
Larch, per M.....	30.00	27.00	26.00	21.00	14.00
Spruce, per M.....	25.00	23.00	20.00	16.00
Fir, per M.....	27.00	22.00	19.00	14.00

The annual sustained yield on the 10,000 acres of Trippstadt forest amounts to 2,280,000 board-feet, the larger part of which consists of Scotch pine and spruce.

2. Near König, in the Odenwald, the white pines introduced 120 years ago by the Hessians who went to America to visit George Washington, have become twenty-two inches to thirty-four inches in diameter, breast-high. (See illustration No. 4.)

3. In Heidelberg Forest, experimental plots of white pine and other American conifers were started in 1887-1888; 2,735 two-year-old White pine

seedlings were outplanted per acre at an expense of \$10.60. Subsequent silvicultural treatment cost \$14.28 per acre. In 1908, the stand was fifty cords

per acre. From 1903 to 1908, the average annual growth was three and eight-tenths cords per acre (cords of 128 cubic feet, containing eighty-five cubic feet of solid wood). A thinning of two and eight-tenths cords per acre in 1903 netted \$3.50 per acre. Illustration No. 5 shows the density of the stand, the uniformity of growth, and the clearness of the boles after pruning.

4. An excellent stand of White pine fifty-five years old is found near Isenburg, south of Frankfurt, in the delta region of the Rhine and Main rivers, where conifers form twenty-four per

cent of the forests, beech forty-six per cent, and oak thirty per cent, the soil being mainly sand over limestone. As early as 1430, oak acorns and pine cones (not *Pinus strobus*, for Columbus sailed sixty-two years later) were introduced from Nuremberg, and working plans were formed for the production of timber for boats and houses. In 1857, American white pine seedlings two years old were outplanted, with alternating rows of oak, the soil having been occupied by beech.

To-day, a dense forest of white pine, 285 trees per acre, averaging seventy-five feet in height and thirteen inches in diameter, breast high, is the reward for the careful work of the German foresters (see illustration No. 6). The average annual increment has been as follows:

Up to 1880. 1.6 cords per acre
Up to 1902. 2 cords per acre
Up to 1907. 2.1 cords per acre

The present stand, timber only, is 101 cords per acre.

The investment will prove remunerative, as the inferior Scotch pine brings \$15 to \$40 per 1,000 board-feet. The forests of this district cover 4,500 acres, yielding a net yearly revenue of \$5.50 per acre. The yearly planting expense is \$2,400, or 53 cents per acre on the entire area. The yearly road expense is \$1 per acre. Heavy investments of this character are possible only under favorable economic conditions, such as high prices for forest products, safety



AMERICAN WHITE PINE

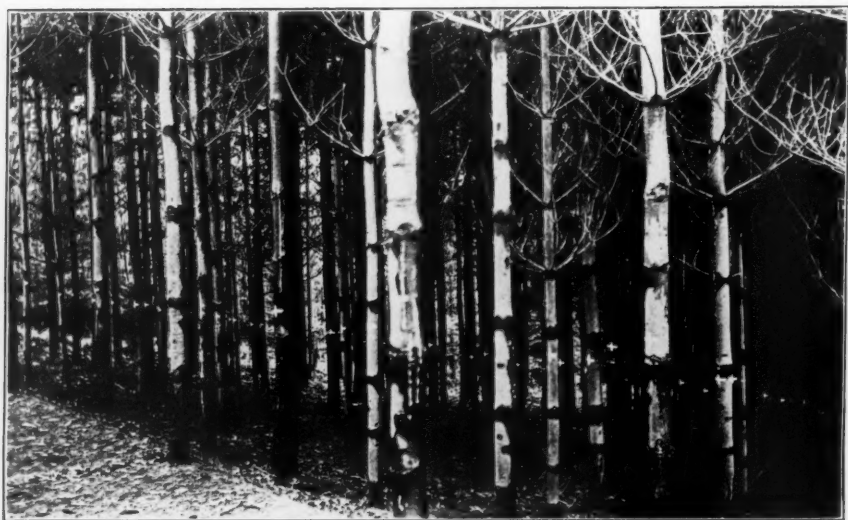
One hundred and twenty years old, König, Germany

from fires, small forest area per capita of population, complete system of transportation without and within the forest, taxation based on soil productivity, agreement among owners to cut only enough to supply the demands of the consumer, ownership of state or community or corporation able to withstand long-time investments.





AMERICAN WHITE PINE
Fifty-five yearsold, Isenburg, Germany



AMERICAN WHITE PINE
Experimental plot. 24 years old, Heidelberg, Germany



PINERIES OF RHINE VALLEY

Studying a clear cut of Scotch pine, 114 years old, containing 10,800 board feet per acre, and 35 cords. Value of cut \$350 per acre



LOGGING TRAIN

Germany



LINCOLN DAY IN GERMANY

American forestry students celebrate at Darmstadt by unloading two cars of yellow poplar and oak from North Carolina



OAK LOGS IN GERMANY

These logs at Mitteldiek are worth \$100 per thousand

THE MISSION OF EUCALYPTUS

By FLORENCE LILLIAN PIERCE, Secretary of the Forestry Society of California

MAN'S ingenuity is wizard-like. It has conquered earth, water, and air. It has controlled war, pestilence, and famine, yet the danger attending the rapid depletion and the foretold future exhaustion of the forests has taxed more than the genius of man. It has almost challenged nature.

The present outlook of the country from a forestry standpoint is appalling. Civilization is steadily crowding into the timber reserve; commercialism is denuding the hillsides of shade, warmth, drainage, soil, and water supply, to obtain merchantable lumber; and the official reports calmly state that unless some means of prevention or cure is taken, the forests will be exhausted in the measurable future.

The war debt can be paid, the government can levy a revenue to meet its expenses, but the forests have no means of conserving themselves, no natural method of sure, immediate, or rapid recuperation except through the assistance of man.

The forestry departments, national and state, and the forestry societies, have done much to arouse the country to a realization of the approaching forestal crisis. The result has been a spurt of economic forestry, so to speak. Denuded lands are being clothed with young trees; ugly scars left by forest fires are being hidden by sapling foliage; where there has not been shade enough for a humming-bird, miniature forests are waving; and the farmer who has a patch of trees, just for fuel, has grown conservative with his ax-strokes. Yet alarming conditions have been little bettered for immediate realization, because the time required for trees to mature to forestable age makes the present planting practically nothing but an impetus toward supplying woodlands for posterity.

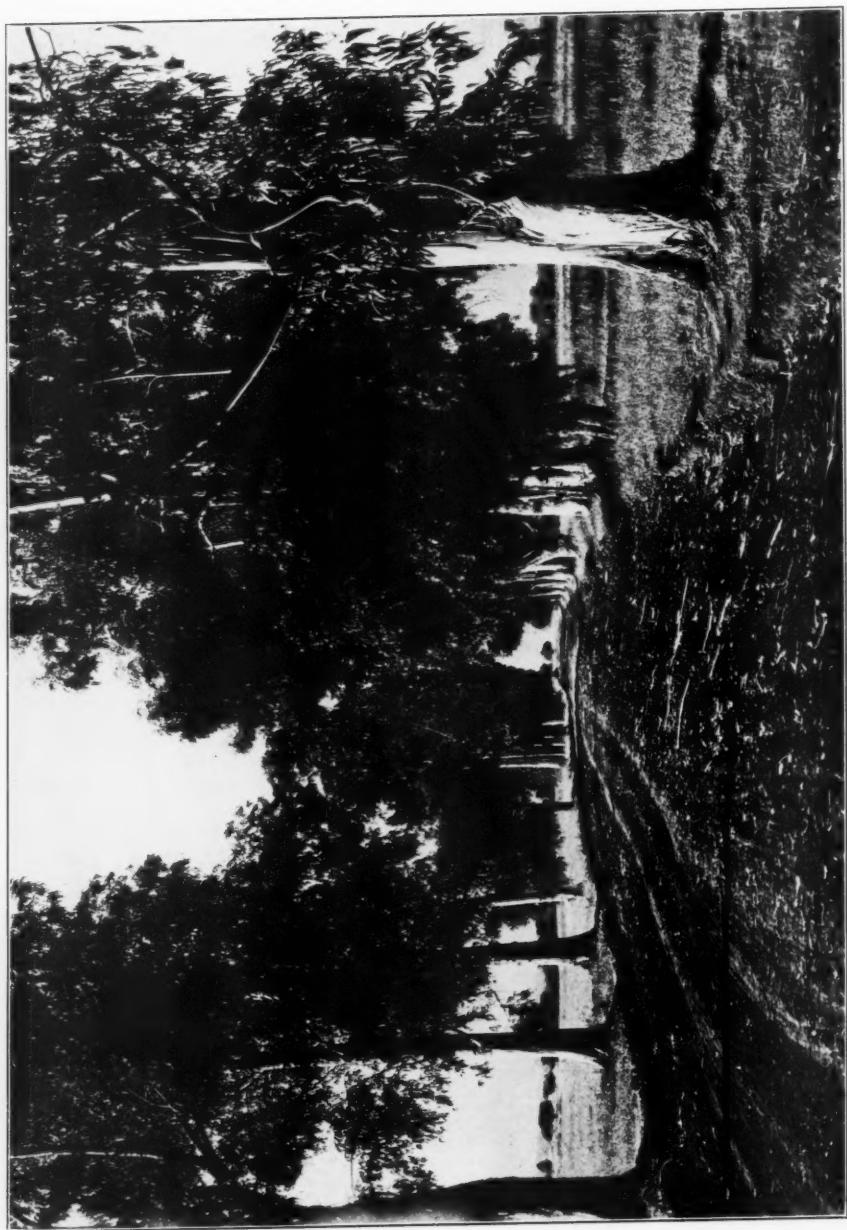
A wise proceeding; but something must be done to obtain results for us as posterity's ancestors. The man who is putting money in the bank for future use must have present sustenance. To conserve the forests for coming generations, there must be an immediate timber supply to meet the present existing demands.

The frenzied question has been and is, "How shall we fulfil the demand?"

The answer has come from the far-off island of Australia. In 1856 she sent us missionaries destined to become the saviours of the nation, missionaries that are to have an unerring influence on the geological, geographical, agricultural, industrial, and climatic conditions of the golden state—the eucalyptus trees, of Australian parentage, the adopted trees of California.

Missionaries there are who have been sent to far lands; others have remained in the home field; but who has heard of their being imported into this country? Yet it has been done, and remarkable are the things which the eucalyptus missionaries are to accomplish, and lasting are to be the results, for they bid fair to replace the trees that have been slaughtered; to become a substitute for much of the timber in current commercial use; to provide for future needs of the present generation; and to furnish forests for generations of descendants.

With remarkable tenacity to life, these trees rush in and grow where other trees are helpless to root; are cut down, and again reproduce from the hacked stumps. And therein lies the wonderful secret of their remarkable adaptability as a means of reforestation. The second growth, contrary to the habit of other trees to weaken in second production, furnishes a better quality of wood than the first, and through



EUCALYPTS AS SHADE TREES

These dimensions are attained in from ten to twelve years

time indefinite the tree stumps will reproduce and each growth is superior to the ones preceding. It is said that the eucalyptus never dies a natural death.

The eucalypts rival the garden weeds in their rapidity of growth; and they compete favorably with the hardwoods in strength, beauty, and texture. For every purpose for which wood is used, the eucalypts meet the demand. They may serve as forest blankets to cover hills and mountains, to conserve the moisture, to save the soil, to provide warmth and shelter from winds, and, while performing these duties, the trees are becoming invaluable for lumber and timber supply.

In spite of the critical and skeptical ideas concerning eucalyptus disseminated by those who have not taken the trouble to investigate with a view of determining the truth or falsity of extravagant statements, the fact remains that the eucalypts are the missionaries that will reforest our country, for the current time and for futurity.

The state and the nation are awake and rubbing their eyes to the possibilities of eucalyptus. The value of the trees for forest purposes in this country was practically unknown until recent years. True to its botanical name, which means "well concealed," the eucalyptus has reserved its qualities, it would seem, until a period in which they could be fully appreciated by the country which they have come to convert.

Eucalypts grow the most rapidly of any hardwood timber trees in the world. With only this quality to back them, they are invaluable in use to replenish the land devastated by forest slaughter, besides acting indirectly as the agents of good soil, moisture conservers, and exercising a perpetual climatic influence.

California has been especially honored by this imported tree, for outside of its native environment, eucalyptus reaches its fullest and most satisfactory development in this state. For years she played with this treasure, not knowing that through its cultivation she is likely to become the forestry angel of the nation. Of all the southwest, the

golden state has the monopoly of conditions favorable for the extension of the cultivation of eucalyptus, placing her in the enviable position, if she improves them, of supplying the United States with hardwood—that, too, without a long wait of years.

The value of a tree depends on its adaptability to the use to which it is put. Surely, a tree in whose trunk are stored the products which keep a great portion of the industrial world revolving, has proved its adaptability. The study of the trees made by the national and state governments has been extensive, and the reports issued, in favor of the eucalyptus industry, have led to liberal planting.

The maximum period of careful cultivation required by the eucalyptus is two years. After that the tree goes into partnership with itself and stores its crop values with the owner absent or present. Reasonable judgment in planting is sure to be rewarded with astonishing profits. The drawbacks that usually attend new industrial ventures are conspicuously absent in the cultivation of eucalyptus, unless attempts are made to grow the trees under exceptionally unfavorable conditions. Then toleration and patience are needed to stem a crisis or failure. Under half-way encouraging conditions, the industry is capable of practical management and becomes profitable. The future will see few barren hills or treeless deserts, for the towering eucalypts, with their blue-green foliage, will cover the unsightly and monotonous wastes.

Exaggerated statements have been made concerning the profits to be derived from eucalyptus growing. These are spread through ignorance, for a brief acquaintance with the tree and its habits shows any one that it is not necessary to overstate truths that are almost exaggeration in their veracity.

"By their fruits ye shall know them." Millions of these trees not yet planted and others not yet sprouted will be ready proof of their value inside of ten years or less.

To the golden state the culture of the eucalyptus means more than its gold



EUCALYPTUS

Second growth, six years old. This has not been thinned, the shoots being allowed to grow for fuel purposes

mines. The slender shoots planted to-day are to be the rescue of the state and nation for all of the to-morrows. The groves they produce will be standing, and yielding timber, when the cement buildings of to-day are crumbling in decay. We have the history of the remarkable longevity of life of these trees in their native country, Australia, to back the statement; and it is through such ceaseless productivity and clinging to life, and their rapid growth,

ranking them above all other hardwood trees, that the eucalypts of California will perform their mission of reforestation.

EDITOR'S NOTE.—The foregoing article puts effectively the views of Californians in regard to the eucalyptus. It must always be remembered that the eucalyptus is fastidious in regard to climatic conditions and can only be grown in certain limited areas of the southwest and possibly Florida. Other articles on this subject will appear later, one by the state forester of California.



EUCALYPTUS AS FOREST COVER FOR PARK

Los Angeles, California

WOMAN'S WORK FOR CONSERVATION

Notes from the Biennial of the General Federation of Women's Clubs

By MRS. LYDIA ADAMS-WILLIAMS

CONSERVATION was the keynote of the biennial meeting of the General Federation of Women's Clubs at Cincinnati during the second week in May, and the spirit of "Let's work for it with all our hearts" permeated the atmosphere of the great convention. Former Secretary of the Interior James R. Garfield was to have delivered the address at the formal opening of the convention, but he was prevented by illness in his family, and his place was taken by Rev. Charles Frederick Goss, who spoke of some of the phases of conservation, especially in its relation to the home, and of women's great part in it.

Friday, May 13, was Conservation Day, and it was the consensus of opinion that it was the best of all. At the general meeting in the morning in Music Hall, Mrs. F. W. Gerard, the able and painstaking chairman of the committee on forestry of the general federation, opened the discussion, submitting the report of her committee.

REPORT OF FORESTRY COMMITTEE

MRS. F. W. GERARD, *Chairman*

Madam President and Delegates:

It was the good fortune of your chairman of Forestry to begin her official duties by attending as delegate the conference of the National Conservation Commission, held in Washington, December, 1908. This commission was called to report, after taking an inventory of the nation's natural resources, in continuance of the work inaugurated at the memorable meeting of the governors at the White House, in May, 1908.

These meetings have passed into history, but they are regarded as making a national epoch, second only in importance to that at which the Constitution of the United States was framed. It has been truly said, that never in the history of any nation has a

statement so valuable been compiled and prepared; never has any nation known so well where it stands with regard to its national resources, and never has any nation had such a terrible indictment for profligate waste of its inheritance.

Two states have established precedents which are significant of the trend of public opinion toward European methods of forest administration, namely, in New York we have the first example of a privately owned reserve under state control; and the supreme court of Maine has recently rendered a decision in a hypothetical case, that the state can regulate the cutting of privately owned woodlands.

When four-fifths of our timber lands are in private ownership and only one-third of a tree is utilized in our wasteful system of lumbering, and only enough timber left to last thirty years, it can readily be seen that for our own interest the state or nation must soon interfere.

The most eminent conservation work begun by our Federation, the saving of the Big Trees, was brought to a successful conclusion last year. The credit for this belongs to Mrs. Lovell White, of California, who worked unceasingly for nine years, and finally, after personally interviewing every representative and senator in Congress, succeeded in her efforts to preserve these greatest living wonders. If no other work but the preservation of the Big Trees and the Palisades of the Hudson had been accomplished by our Federation, we should have justified our existence as an organization.

Another campaign to secure the passage of the Weeks bill has been very actively conducted this last year by the women's clubs. It is interesting to note that there is no sectional feeling among the women in regard to this question. In Colorado, which is the seat of hostility to all forestry reserves among the men, the women have worked unceasingly for this bill.

It is to be regretted that time is only allowed to present some of the most notable lines of work undertaken by the clubs. The reports show that thousands of trees have been planted, and that shade trees in towns and cities are becoming generally the wards of women's clubs; while this is valuable and necessary, the point should be emphasized that it is not forestry.

The Colorado federation last year was responsible for the expenditure of a fund of \$5,000 for trees and shrubs, and has distributed tree seeds to every club in the state, and is also using active influence for a great irrigation scheme at the present time.

Delaware clubs cooperated with the trustees of their university and secured a state forester, which is the first step that should be taken in a state desiring to establish a forestry system. Florida women were instrumental in securing the national forest reserves in their state.

The New England states and New Jersey are cooperating with their state foresters, to use their club audiences as lecture centers to spread the gospel of forestry. Hundreds of acres are now going under forest cover in Connecticut as the results of this system of education, the state forester, the president of the Connecticut Forestry Association, and the chairman of the Federation forestry committee forming a lecture staff. It is the opinion of your chairman that that is the best way to get actual results in forestation.

The civic division of the Iowa federation will put thousands of dollars of bluff park lands into the hands of commissions and co-operate with them in caring for it.

Illinois has been active in many directions. One club in Chicago succeeded in having the city forester appointed. The Belt line park system was the suggest of another club. The Federation is doing yeoman work to save the Ogle County white pines for a state reserve.

Maine also has worked for Mount Kahtadin as a state reserve. The state chairman of forestry for Kentucky has compiled a valuable manual of the trees of her state. Florida had a similar list prepared for the Federation by Mr. John Gifford, by request of the state chairman.

Mrs. Patterson, chairman for Indiana, has written a charming little play for the use of the schools on Arbor Day. Mrs. Wilkinson's efforts as chairman for Louisiana have covered a large field; she is responsible for the organization of a state forestry association. This is most valuable work, as it means an organized body, watching and working for state forestry legislation.

Ohio has only had a forestry department this year, but has already donated trees to a hospital, saved historic trees, and is working in many lines of civic improvement.

Notable work for school gardens is done by the City Federation of Saginaw, Mich. The Grand Rapids Woman's Club has bought land and planted it with trees. Nearly all the states are studying forestry questions, and are trying to have some elementary forestry introduced into the schools.

Our work for the Audubon Society is not as active as it should be. Can we logically work for conservation, and expect to be listened to, while we still continue to encourage the destruction of the song birds by following the hideous fashion of wearing song birds and egrets upon our hats?

We know that the insect pest has worked an economic change in agricultural processes, and if we wish we can, not only as federations but as individuals, render great service to the cause of conservation by refusing to be decorated with dead song birds. If women can raise freight rates because of the size of their hats, they can reduce the insect pest by changing the trimming.

It has been the policy of your chairman to urge the women's clubs to seek cooperation with existing commissions, associations, and persons engaged in forestry work in their respective states. Membership in the American Forestry and National Conservation associations is recommended. Conservation of native plants and birds are lines of work particularly in the province of women, and are therefore urgently recommended.

As all civilized countries but the United States have a quarantine law against imported nursery stock, and as more than half the agricultural insect pests have come to us from other countries, it is urged that we work for a national quarantine law against imported nursery stock.

The first recommendation sent to the clubs from your chairman is the last one—work to secure a state forester, or, if you have one, place yourselves under his direction.

The questions sent from this department were designed to be suggestive of lines of work, as well as to secure information. Realizing that they do not fully cover all the work, reports from chairman have been requested. Very few have responded.

Your chairman has delivered fifteen forestry addresses, visited two state federations, and been twice to confer with the forestry department of the New Jersey state federation.

Report from the Questions—1,876 Clubs Report

1. What especial line of conservation has your club undertaken? 150—Forestry, waterways, trees in cities, Weeks bill, and Hetch-Hetchy Valley.
2. Has your club assisted other associations in holding forestry institutes, lectures, or in introducing elementary forestry into the public schools or normal training schools? 266—Lectures and introducing elementary forestry in public schools.
3. Have you helped to secure any state legislation in behalf of forestry laws by letters, personal interviews, or petitions, such as forest fire laws, remission of taxes for afforestation, or appropriations for buying waste land for demonstration forests? 283—Have sent petitions and letters for state and national legislation.
4. Has your club studied any of the following forestry questions: (a) Raising Christmas trees as a crop, by the farmers? (b) Forest cover for reservoir lands? (c) The city or municipal forest for income and esthetic value? 168 clubs have studied some or all of these questions.

5. Are you helping the movement for bird protection or to prevent the extinction of the mountain laurel, arbutus, and maiden-hair fern? 250 clubs help bird protection.
6. Is Arbor and Bird Day observed in your public schools? 964 cities and towns keep Arbor Day.
7. Do you use the Forest Service bulletins? 218 clubs use Forest Service bulletins.
8. Do you cooperate with the tree warden or other tree official in your city. If so, in what way? And with what results? 240 clubs cooperate with city officials—excellent results.

In closing this report, it is a great pleasure to thank the members of the board and members of the forestry committee for their courtesy, and especially Mrs. Henry F. Brooks, the vice-chairman, whose instant response to every request and earnest cooperation in all details of our arduous work have been of the greatest assistance.

Respectfully submitted.

(Signed) JESSIE BRYANT GERARD.

May 13, 1910.

The best way to express Mrs. Gerard's interest and work for forestry is to say that she has been everlastingly at it for the last twenty years or more. She was chairman of forestry for Connecticut even before the general federation took up the work. Mrs. Gerard believes in doing rather than in talking and she always gets practical results from her efforts. She cooperates with the state forester and arranges meetings for the clubs, and the clubs advertise the meetings and make the local arrangements. She does much work before farmers' clubs, men's clubs, and women's clubs; these lectures by Mrs. Gerard always lead up to practical results, as planting and reforestation follow her addresses. Mrs. Gerard's special work for Connecticut is to get the different cities to get their reservoir sites under forest cover. Notable work has already been accomplished along these lines in Norwalk and South Norwalk, in Mrs. Gerard's home locality. "We all expect to do good work in New England," said Mrs. Gerard, "for we are all going to pull together, as our interests and needs all through New England are similar. Thousands of shade trees have been planted by the women's

clubs, and it would seem as if the shade tree is the ward of the women's clubs."

Gifford Pinchot was to have spoken at the morning meeting on "The Forest and the Family," but his absence in Europe prevented. This was a great disappointment to many who had counted on hearing him, but his place was taken by William L. Hall, first assistant forester of the United States Forest Service, who spoke on "Progress in Saving Forest Waste." Many who heard it pronounced this the best speech of the convention.

Mr. Hall paid a high tribute to the work women are doing for forest conservation, saying: "As one actively engaged in forestry work, I want first of all to acknowledge the wonderful service of women in forest conservation. The work has advanced notably, but without the aid of the women, who have given of their time and energy, for the sake of their convictions, it would not have made such appreciable strides. The women have sometimes led," said Mr. Hall, "sometimes been among the first followers, but they have never lagged. They were the first to sense the importance of this great movement, and not a single step has been taken except by the aid of the women of America. If we stop now," continued Mr. Hall, "little permanent good will result; all our work will be lost. What we have done will only amount to something if we go on."

Mr. Hall made the prediction that lumber prices will go higher and remain higher for a good while. He said the checking of waste of forest products can be accomplished by the cooperation of the lumber-using public and the government and the application of proper lumbering methods.

In speaking of the waste which threatens the destruction of the forests at present, Mr. Hall said the waste from the mills where spruce, hemlock, and poplar are sawed would produce all the wood pulp necessary to make all the paper produced in the country. Enough pine wood goes to waste in the southern sawmills annually, he said, to produce all the tur-

pentine the country consumes, and most of the nation's consumption of wood alcohol could be made from the waste in northern mills using beech, birch, and maple.

Mr. Hall declared there was also an uncalled-for waste when new lumber was used for the manufacture of such simple articles as meat skewers, when they could be made just as well from the trimmings from vehicle factories. He said the time would come shortly when the lumber-using public would have to be content to buy short lengths of lumber, and means would have to be taken to utilize the waste. Mr. Hall said that a concerted effort is being made on the Pacific Coast to put odd lengths of lumber on the market. He said it was a wasteful policy to buy sixteen-foot lengths and then cut them into four-foot lengths. He also said that from two to three feet should be the minimum length, instead of ten feet, as at present. Mr. Hall said that we cut every year wood enough to make a solid cube one-half mile square. Twenty-five per cent of this wood never is taken out of the forest at all, but goes to waste there. Thirty-five per cent is lost in slabs, edgings, sawdust, etc. Waste never ceases. Even when the wood goes into houses, chairs, ships, bridges, boxes, or ties, the waste continues. There is waste in the woods, in the mill, and in service. The causes of waste in use are fire, decay, insects, marine borers, or ship worms, mechanical wear, etc. Nine billion (9,000,000,000) board-feet annually is the estimated loss from these sources. This may be largely prevented through the preservative treatment of lumber by which the life of railroad ties, bridge timbers, paving blocks, posts, poles, etc., may be prolonged and their usefulness increased.



MRS. F. W. GERARD

Of Connecticut, Chairman of the Forestry Committee of the General Federation of Women's Clubs

There are at present eighty commercial plants for treating lumber with wood preservatives.

Mr. Hall gave an excellent account of the Forest Service laboratory, which will be opened at Madison, Wis., June 4, and which will be prepared to investigate all practical forest problems.

Mrs. Hoyle Tomkies, of Shreveport, La., president of the Woman's National Rivers and Harbors Congress, spoke at the morning session and at the conference in the afternoon. Special enthusiasm greeted her appearance, as her graciousness, tact, and executive ability have won her way to the hearts of all who have met her. She spoke of the work of the congress on behalf of the waterways, and made a plea for cooperation.

Hon. Joseph E. Ransdell, of Louisiana, president of the National Rivers

and Harbors Congress, and author of the slogan "A water policy, not a water project," aroused the women in the convention to great enthusiasm. He showed the function of waterways, free high-roads for all the people in preventing monopoly in transportation. Terminals on navigable waters, he said, should be public property and all transportation agencies by land or water should use them on equal terms. He declared the pending rivers and harbors bill to be the best ever enacted. It carries an appropriation of \$50,000,000; it is to be annual hereafter, instead of triennial; and it adopts a fixed policy for completion of the great projects within a definite period of time.

Another of the bright women who are earnest in conservation, Mrs. Emmons Crocker, vice-president for Massachusetts, of the Women's National Rivers and Harbors Congress, was one of the speakers, taking as her text "Wifful Waste Makes Woful Want." She spoke upon waste of soils, fertilizer, sewage, and minerals.

THE CONFERENCES

The afternoon conference on forestry was opened by Mrs. Gerard, and the work of a number of the state federations was reported upon. Especial distinction was accorded to the achievement of the Kentucky federation in publishing an admirable hand-book of the trees of the state, prepared by Mrs. Mason Maury, of Louisville, chairman of the forestry committee. Another work of publication is an outline for study classes in conservation, by Mrs. F. H. Tucker, chairman of the forestry committee of the Massachusetts federation.

Edwin A. Start, executive secretary of the American Forestry Association, was the speaker at this conference. He paid a high tribute to the work of the United States Forest Service, and to the national forester, Henry S. Graves. He laid down a conservation platform, in regard to which he felt sure there would be no disagreement, and on these premises discussed the question, "What

shall we do to be saved?" insisting that every one has a personal responsibility. Referring to the need of organization, he described the work of the American Forestry Association, its relation to such organizations as the General Federation of Women's Clubs, and the ways in which each could be helpful to the other. He took up the question of personal duty toward these questions, urging this point: "Study this question for yourself until you have a clear, intelligent understanding of its main principles at least." Having discussed this question of personal knowledge and the means of attaining it, he took up the application of this knowledge, which consisted in general in doing the task nearest at hand, passing along in the home the knowledge obtained by personal study, seeing that adequate provision is made in libraries and schools for informing the younger generation, practicing principles of tree and forest culture if a landowner, and promoting municipal, state, and national forestry. Above all, he made a plea for earnestness, sincerity, and thoroughness, as only work so characterized counts.

Mrs. S. B. Sneath, state chairman of conservation for Ohio, presided over the waterways conference in place of Mrs. John Dallas Wilkinson, the national chairman, and she immediately turned over the management of affairs to Col. John L. Vance, president of the Ohio Valley Improvement Association. He introduced Capt. J. F. Ellison, of Cincinnati, secretary of the National Rivers and Harbors Congress, who is always a welcome and pleasing speaker. Other speakers of the conference were Congressman J. E. Ransdell, and the two energetic field secretaries of the National Rivers and Harbors Congress, John A. Fox and S. A. Thompson, each of whom made an eloquent plea, urging the women to exert greater efforts to secure cheaper transportation and the better development of the waterways.

The national chairman, Mrs. J. D. Wilkinson, called a waterways conference for the following morning, at which Mrs. Lydia Adams-Williams presented the year's report for the District of Columbia Committee on Waterways.

SOME WORK DONE AND WORDS SPOKEN

Mrs. A. B. Avery, secretary of the Louisiana Forestry Association, is one of the tireless and efficient forestry and conservation workers who was present at the biennial. Mrs. Avery secured the passage by the Yellow Pine Association at New Orleans in January of a resolution relative to regulation of the cutting of timber to meet conditions of supply and demand. Mrs. Avery maintains a small nursery of her own, in which she planted 2,700 seedlings last year. Her object is purely philanthropic, the trees being furnished for public improvement. She recently donated forty trees, in pairs of different species, to be used on the grounds of a public school.

Mrs. Herbert M. Bushnell, of 1942 South Seventeenth Street, Lincoln, Nebr., who is general secretary for her state, takes a great interest in forestry. She prepared and read the first paper on forestry that was ever presented at her state federation. That was over twelve years ago. "I didn't know much about forestry then," said Mrs. Bushnell, "but I began to study up, and since that time I've done everything I could for the preservation of our forests."

One of the many bright women from Indiana, Mrs. Virginia Sharp-Patterson, who is chairman of the Forestry Committee of the Indiana Federation, has written a play, "The Lady of the Green Scarf," which embodies the need for conserving our country's natural resources, and which may be used as an entertainment exercise for schools, clubs, and Arbor Day programs. The book is prefaced by the following quotation from the writings of Mrs. Lydia Adams-Williams: "By inculcating in the children the precepts of economy in relation to natural resources, the entire sentiment of the nation may be changed in a single generation and convert this people from the most wasteful and extravagant to the most prudent and conservative."

All the friends of conservation, forests, and waterways, especially the officers of the Woman's National Rivers and Harbors Congress, were delighted to welcome back, safe, happy, and in

perfect health, from her round-the-world tour, their national vice-president, Mrs. Charles Warren Fairbanks. In company with her distinguished husband, she visited many foreign lands and was strongly impressed by the different forestry conditions in each of them. "In the Hawaiian Islands," said Mrs. Fairbanks, "I noticed particularly that there is a great deal of planting of trees, especially on the high mountains. Also in some places in China they are planting trees; but the conditions there are very hard; the people are poor and wood is scarce, and the soil has much of it been washed away by erosion. In Korea they are also planting trees. I was much impressed by the beauty of the German forests and the care which seems manifest in their management. I take an intense interest in all vital subjects for the betterment of humanity; consequently, I am much pleased with the work that the general federation is doing for conservation, and I congratulate them and the country in general upon the stand they have taken in this great movement." At the general federation meeting, Mrs. Fairbanks spoke in favor of the mountain laurel for the national flower, and suggested that the federation would aid the movement if it would endorse the laurel.

Another one of Louisiana's enthusiastic workers is Mrs. John Dallas Wilkinson, national chairman of waterways for the general federation, and state chairman of forestry for Louisiana. Mrs. Wilkinson is also chairman of the executive committee of the Louisiana Forestry Association. At her waterways conference she gave a very full report of the year's work, and said that thirty-nine states, including the Canal Zone, have taken up the work for waterways. The other ten states are interested and sent in reports showing activity and a desire to know more of the work.

Mrs. Samuel B. Sneath, of Tiffin, Ohio, the able state chairman of conservation, which includes forests, waterways, and mines, at the waterways conference, reported work for purifying, beautifying, parking, and making sani-

tary the streams. She has distributed literature, and worked in the schools and through the press. Mrs. Sneath says: "In Ohio we must protect the banks of streams from spring freshets."

The state chairman of forestry for Nebraska is Mrs. W. A. Harrison, of York, Nebr., of the well-known Harrison family who have done much patriotic work for the state, especially along forestry lines. In recognition of the work she has done, Mrs. Harrison is called "the tree woman." Mrs. Harrison says: "We have a woman's state conservation committee, and we have had two state conservation congresses in Nebraska. At the next state conservation congress to be held this winter, we shall have our woman's conservation committee recognized, and we shall have a woman speaker on conservation on the program."

"My publicity chairman for my conservation committee of forestry and waterways," continued Mrs. Harrison, "is Mrs. J. M. Ragan, 505 Bellevue Avenue, Hastings, Nebr. She is a sister of Governor Shallenberger, of Nebraska," said Mrs. Harrison, "and he is an ardent supporter of the conservation movement, consequently our conservation committee of forests and waterways expects to accomplish great things."

Mrs. Harrison said that in her state wherever there were women as college professors, superintendents, or school teachers, she received many requests for information on forests and waterways and conservation, but that she had not received a single inquiry from any of the male teachers, superintendents, or professors. This was probably because they did not know where to inquire.



SOME OBSERVATIONS ON FORESTS AND WATER-FLOW

By J. T. ROTHROCK

THE report, "The Influence of Forests on Climate and on Floods," recently published, by Willis L. Moore, chief of the United States Weather Bureau, though quite full and apparently intended to discuss in detail the entire relation of forests to water-flow, singularly enough omits entirely one most important aspect of the problem.

So far as I can discover, little, if anything, is said specifically of the influence of forests on water-flow *during the winter*.

The least reflection should have indicated that this merited special consideration, if for no other reason than that the problem of leaf-evaporation is almost wholly eliminated at that time and that this would materially affect the quantity of water retained by the soil for flow at the period of low-water stage.

There is, however, another and more direct relation to be considered, which seems to me to be of great importance. It is the capacity which the forest floor has *in winter* for receiving and retaining moisture as contrasted with the same power of the open, cultivated land, at the same time.

I am led to call attention to this by some observations made by me during the last winter:

It will be remembered that the summer, autumn, and early winter of 1909 were, in Pennsylvania—at least, in the eastern half—of exceptional drought. The soil was literally dried out. Springs and wells which had not, within the memory of living men, failed, ceased to flow. Cattle were driven and water hauled great distances. So it may be fairly assumed that the soil in forest

and in field was in a most receptive condition for any rain which might have fallen. December 13, there was, in Chester County (Pennsylvania), a remarkable rainfall of two and seventy-eight one-hundredths inches, and there was also some little snow before Christmas. This moisture was speedily gone, apparently, owing to the thirsty condition of the soil, and on Christmas day the drought was again so pronounced as to elicit general comment. There had been but little added to the general water-flow, and the country was still in a very suffering condition.

On Christmas there was a fall of snow which averaged in depth, on the level, from sixteen to eighteen inches. This was followed by a lowered temperature, and on the 28th the mean thermometer was twenty-one degrees. On the 30th the mean temperature was ten degrees. December 31, it was 17 degrees. The ground was solidly frozen to a depth of several inches. January 1, 1910, the mean temperature was twenty-seven degrees. January 2 it was forty-three degrees, and on the following day the mean was thirty-five degrees. It is needless to say that the snow was melting rapidly, though it showed but little corresponding flow in the fields, because, as the ground was frozen, most of the water was absorbed by the snow itself, and the country was in a slushy condition.

For several days I had been making observations in the woods and on the fields upon the condition of the surface soil. In the woods, where the leaves covered the ground, I found that it was possible to thrust an iron-shod cane without difficulty to a depth of eighteen inches into the earth, unless

it was stopped by a root or a stone. This was, no doubt, mainly due to the fact that the leaves had retained the heat of the earth, as our clothing retains the heat of the body. It is probable, also, that some heat was evolved by the process of decay in the lower portion of the bed of leaves. On the open ground, whether the snow still remained or had drifted away, the resistance to the thrust of the cane was solid, almost as if I had struck a rock. To this there was but one exception, where there was an unusually dense covering of long grass. Under a matted surface of this kind I could still thrust my cane into the ground of an open field.

It requires no argument to prove that in the dry, unfrozen soil of the forest the water could and did penetrate. It is equally obvious that it did not penetrate the frozen surface of the field. Had the thaw continued, there is no doubt we should have had a considerable rise in our streams, but on January 4 the mean temperature fell to ten degrees. Observations made on the morning of the 5th showed that where there was more water than was taken up by the snow it had run off on the surface, and what had not so escaped was frozen in the temporary channels on the fields. On the 5th the mean temperature was seventeen degrees. The thaw was arrested and the freeze was upon us. January 6 the mean temperature had risen to thirty-three degrees. There was also .33 inches of rain. January 7 the mean temperature was twenty-five degrees, and that of the 8th was eighteen degrees. January 9 and 10 it was twenty-five. January 11 it was twenty-two degrees.

The mean remained near the freezing point until January 18, when it rose to forty. There was at the same time (18th) half an inch of rainfall. The mean for the 19th was thirty-three degrees. On the 20th it was thirty-six degrees. On the 21st it was forty-five degrees, and on the same day the rainfall was .72 of an inch. My journal for the same date records that in the forest-tree nursery at Mont Alto I found the ground solidly frozen, though

in woods immediately adjacent the leaf-covered forest floor was not frozen.

At this time, on the mountain plateau, back of Mont Alto, at an altitude of 1,650 feet above tide, the rain and melting snow from the cleared land flowed over the road, and even the culverts were inadequate to remove the volume of water. I had never before, during a residence of six years, witnessed such a condition of affairs. But mark the contrast on the adjacent forest-covered slopes of from two to three thousand acres. The snow was melting there, too, and rain was falling on the forest floor just as rapidly as on the open fields. There was, however, no torrent, because the water was being taken up by the unfrozen soil of the forest. When toward the end, the stream which carried the water off did rise, the increase was small in comparison with the flood from the open ground.

I should add that the flow from the open ground went off by one stream, and that from the forest went by another, so that it was easy to make the comparison.

From the 22d of January until February 6, the mean temperature varied but a few degrees on either side of the freezing point. I merely allude to this to remark that the forest floor was still unfrozen, and the surface of the field remained frozen. The heat of the day was not sufficient to overcome the cold of the night.

During the nineteen days from the 6th to the 25th of February, the mean temperature was below the freezing point thirteen days, and the surface of the fields remained frozen.

The thaw which commenced on February 27 may be said to have broken up the winter. From the upper waters of the Susquehanna, almost to the Maryland line, vast quantities of melting snow were pouring out of the country. It was a flood of sufficient magnitude to have satisfied Mr. Moore's most exacting demand. Observations made at this time showed that the forest lands were still absorbing water. The most of the flood must, therefore, have come from the open ground, for the forest streams were not greatly swollen.

No doubt some of this water from the fields did, as surface water, aid in the temporary restoration of our springs and wells.

From March 1 until April 17 we had (in Chester County, Pennsylvania) but little rain. (The West Chester record kept by Doctor Green shows but 1.37 inches.)

The country was again suffering from drought. Farming operations were delayed because of the condition of the soil. Complaints were again heard because of shortage of water. The relief obtained from the surface flow in the last of February was ceasing. It is fair to say that probably most of the water available just prior to the

bountiful rains of the middle of April came from our forest ground storage.

Where the leaves and humus on the forest floor have been destroyed by fire the ground freezes, just as it does in the open field.

I am aware that there come times when the ground freezes in the forests as well as elsewhere, but I also know that in our Central States this is the exception rather than the rule.

Mr. Moore could not have been ignorant of facts like these, and of their bearing upon the question he was discussing, but the wonder is that he did not make specific allusion to them in so extended a paper as "The Influence of Forests on Climate and on Floods."

THE HISTOLOGY OF RESIN CANALS IN WHITE FIR

By C. D. MELL, Assistant Dendrologist, Forest Service

INTRODUCTION

IN CLASSIFYING the woods of conifers by their structural characters, they are usually divided into two groups; first, those that contain resin canals in the secondary wood, and, second, those in which resin canals are wanting. All conifers so far investigated have resin passages or resin sacs in their leaves, bast, or primary wood. *Pinus*, *Picea*, and *Larix* are usually regarded as the only ones that have resin canals in the secondary wood of both stems and roots. Von Mohl¹ states that resin canals are not present in the wood of white fir, *Abies pectinata* D. C., while Schacht² declares that resin canals are wholly wanting in the wood of all species of *Abies*. Following the announcement of these observations, Dippel³

studied numerous samples of wood of white fir from trees grown under different soil and climatic conditions. The samples were taken from different parts of trees thirty to 100 years of age. With these samples Dippel proved conclusively that resin canals are not entirely wanting in white fir; that they occur less frequently than in the wood of pine, spruce, and larch. The isolated wood-parenchyma cells are invariably associated with the production of resin, and for this reason are termed resin cells; when they enter into the composition of compact groups of cells leading to the organization of secretory passage they are termed resin canals.

The building of resin in these passages is dependent upon the starch in surrounding wood-parenchyma fibers, but it must not be taken for granted that all starch is consumed in the formation of resin, for a great deal is used in other processes. The origin of resin in resin canals is the same as that in small groups of resin cells. As has al-

¹Bot. Ztg., 1860, No. 30, page 337.

²Bot. Ztg., 1862, Nos. 48 and 49.

³Bot. Ztg., 1863, No. 35, page 253.

ready been stated, the contents of young cells is gradually converted into an oily mass and eventually into resin. Transverse and longitudinal sections of older shoots show that during the winter the resin cells are filled with semi-fluid resin occurring either in the form of a thin layer or in small globules.

For convenience of study, Dippel grouped the resin-containing elements in the wood of white fir into single resin cells, large groups of resin cells, and true resin canals. He briefly described the structure of the different groups, their relation to the surrounding tissue, as well as the form and function of the individual cells composing the different groups. The following are the chief facts brought out by Dippel:

DESCRIPTION OF GROUPS

1. Among the single resin cells may also be included small groups of from two to four resin cells (transverse section) found in the wood of the roots and stems (Fig. 1). In the latter they

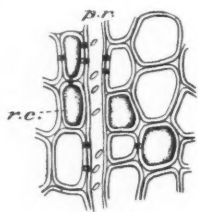


Fig. 1.

usually occur among the thin-walled tracheids of the early wood (spring-wood of Schacht), and are seldom present among the thick-walled cells of the late-wood (fall-wood of Schacht). In wide concentric zones of roots they occupy a similar position, but in narrow zones they are found either among the thick-walled tracheids of the late-wood or in the transition zone between early and late-wood. They are found in all genera of the coniferæ except in *Pinus* and *Picea*, and in structure are similar to those of the wood-parenchyma fibers in Dicotyledonous woods. The individual cells composing these fibers form a

perpendicular row of elements that have either horizontal or oblique cross-walls and contain numerous simple pits. Where the side-walls of such elements are adjacent to other elements of the same order or border on pith ray cells the pits are invariably simple; where they are adjacent to tracheids the pits within the walls of tracheids are bordered, and within the walls of the wood-parenchyma fibers are simple, semi-bordered pits. The character of pits in resin cells correspond exactly with that of pith ray cells. The pit cavities within the walls of tracheids adjacent to resin cells are invariably smaller in diameter than those in the contiguous walls of tracheids. The lumina or central cavities of the resin cells are somewhat smaller than those of the surrounding tracheids which are the elements forming the ground mass of coniferous woods. The average length of the resin cells is between .30 and .35 mm., but they have been found to vary from .15 to 1.05 mm.

In older parts of stems the majority of resin cells are completely filled with resin, while others have thick layers of resin deposited on their inner walls. There are individual cells that are filled during the winter with starchy matter the same as the pith ray cells. In the wood of ultimate twigs resin cells are filled almost completely with starch. With the beginning of the season's growth the starch disappears and a strong light-refracting solution that is volatile and soluble in alcohol takes its place (Fig. 1). In the older portions of the twig the number of starch-containing cells diminishes and those of oil and resin-containing elements increase. In longitudinal section of one-year-old twigs it is found that the cells near the end of the twig contain starch, while those farther back contain merely an inner layer of resin. Here and there starch grains and resin (Fig. 2, r. c.) are often present in one and the same cell.

2. Large groups of resin cells, with which may be classed all those groups that consist of from six-twenty or more, are usually found just inside the

concentric layers of thick-walled tracheids of the late-wood (Fig. 3). Small groups of resin cells may be distinguished from the large groups by the fact that the latter are always sur-

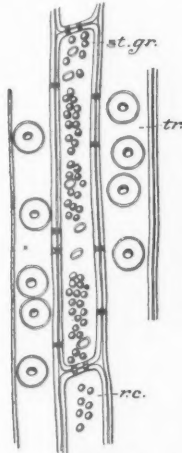


Fig. 2.

rounded by several rows of wood-parenchyma fibers containing starch during the winter. The structural characters of the wood-parenchyma fibers of the single resin cells are similar to those of the large groups, though they are usually much longer, some-

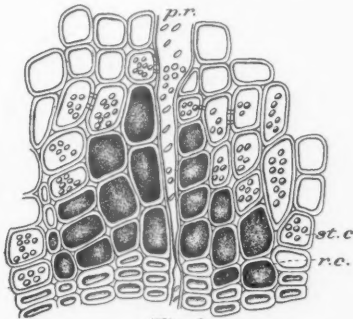


Fig. 3.

times from .8 to 1. mm. in length. The individual starch cells of the wood-parenchyma fibers are very much shorter than the resin cells, varying in length from .08 to .2 mm.

3. *True resin canals* are present in the wood of the roots, stems, and branches. Dippel investigated sections of wood cut from different parts of the tree and determined that resin canals are perpendicular structures extending for a considerable distance, and that they are not wholly independent of each other, but communicate with one another here and there. Dippel also pointed out that resin cells originate as such in the cambium, but for lack of proper material he was unable to follow in detail their subsequent development to maturity. A very careful investigation of resin canals in young twigs, and

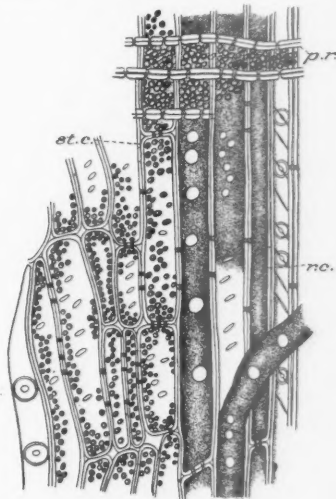


Fig. 4.

also in mature wood cut from many different parts of the stem, yielded important facts from which Dippel made interesting deductions relative to the origin and development of resin cells, and which served him later in his study of resin canals in *Pinus*, *Larix*, and *Picea*. He found resin canals in all samples of white fir and determined that their presence cannot be regarded in any way as abnormal. He also found individual resin sacs similar to those present in other coniferous woods, and concluded that they are a result of abnormal cell development and a subsequent disorganization of their cell walls.

Resin canals in white fir occur in small groups of two to six or more in the early-wood, and usually near the inner boundary of concentric zones (Figs. 5 and 6). These canals are always in direct communication with pith rays (Figs. 5A, 5B, and 6), and are surrounded by wood-parenchyma fibers that contain starch during the winter (Figs. 5 and 6 st. g.). Transverse sections of twigs cut from the top of the tree show that young resin canals consist of compact groups of cells, the central portions of which are composed of

of cells are similar. The pits are simple, and only where resin cells touch tracheids do they appear to be bordered; such borders are always within

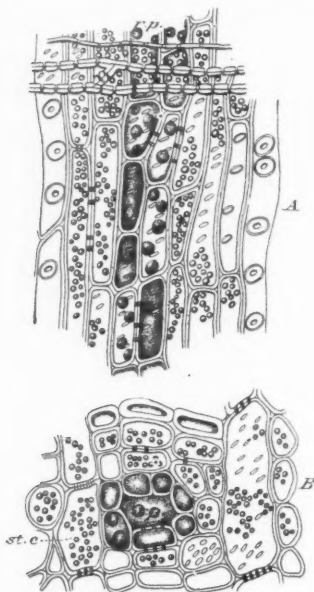


Fig. 5.

numerous round cells with wide cell cavities, but in other respects are similar to the cells that are filled with starch during the winter (Fig. 7). In the early spring, when the vegetable period begins, the starch is replaced by a volatile oil, and during the first winter there is no trace of resin in these cells. Longitudinal sections show that resin passages are surrounded by wood-parenchyma fibers, the cells of which are from two to three times as long as those in the center of the group. In other respects the inner and outer rows

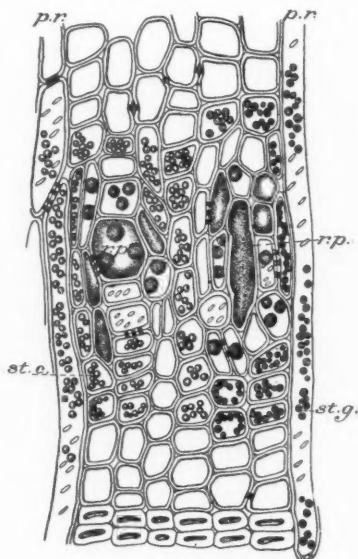


Fig. 6.

the walls of the tracheids. The cells of the young resin passages are filled during the winter with starch (Figs. 7 and 9), which is eventually converted into a fluid mass and later into resin. Trans-

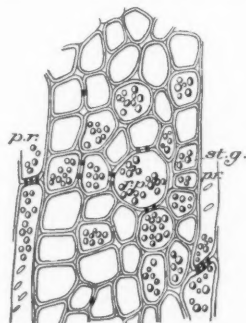


Fig. 7.

verse sections of two to four-year-old twigs exhibit structures similar to that of one-year-old twigs. There is, however, a difference in cell content. In

older twigs the large central cells of resin canals surrounded by longer cells of the same kind contain small globules of resin, and rarely a uniform thick inner layer.

The general structure of resin canals is exactly alike in all parts of the stem. Transverse sections show that the cells in the central portion of the canal have wide cavities and are surrounded by shorter resin-containing cells. The outermost cells are longer and contain starch in winter, and in the beginning of summer contain volatile oil. Such cells are always in direct communication with the pith rays.

Resin canals originate from rows of wide cells above referred to, or by the gradual disorganization of the central

with their cross-walls partly or wholly absorbed. In older twigs all gradations of disorganized side and cross-walls occur, which gradually dissolve, and canals with smooth side-walls develop. The cell-walls within the resin canal are sometimes found intact (Fig. 9). The simplest form of resin canals consists of one perpendicular row of resin cells.

The wood-parenchyma fibers in the uppermost part of one-year-old twigs contain starch during the winter, the same as the pith-ray cells. In older wood the starch is replaced by a semi-fluid resin in which there may be a few

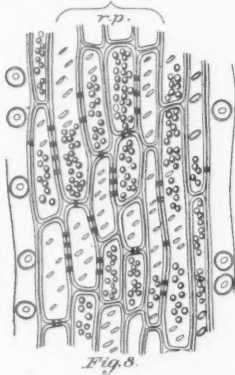


Fig. 8.

cells of a group. Seen in a longitudinal section, the canal that is filled with resin appears to have been formed by the absorption of the walls of resin cells. Such sections show that resin canals are not continuous, but that there are places where the cross-walls have not been wholly absorbed. Twigs from five to ten years old are best for studying the development of resin canals, because in older wood they are already fully developed. If the canals consist simply of wide central cells, such elements may be seen either in their original form or with their cross-walls perforated or totally absorbed. In this stage the side-walls have undergone very little change, and the canal merely consists of one or more rows of cells

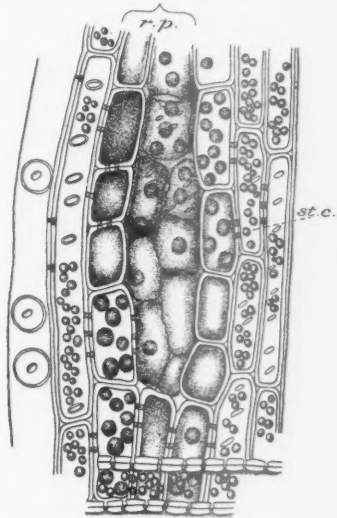


Fig. 9.

grains of starch. After growth has started in early spring the starch gradually disappears, and the cells become filled with a fluid mass which is later transformed into a yellowish or reddish-colored resin. The resin gradually hardens and forms an inner layer or occasionally fills the entire cavity. Longitudinal sections of young twigs show perpendicular rows of wood-parenchyma fibers that contain starch grains in the uppermost cells, while the lowermost ones contain starch and resin or resin only. The starch grains which originally filled the cell cavities

are replaced by a fluid mass which is further transformed into resin. A comparative study of resin passages in young and old parts of stems shows that there is no visible change in the cell-walls while the resin hardens. Careful measurements also show that the walls do not diminish in thickness whatsoever, whether the resin is merely deposited in thin layers or whether the cavities are completely filled.

In the large groups of resin cells, the behavior is similar to that in the small groups. The entire parenchymatous tissue in the younger parts of the ultimate twigs is filled with starch. In the older twigs the cells toward the inner part of the stem are filled with resin, while the wood-parenchyma cells surrounding them are filled with starch during the winter, and during the summer contain a liquid resembling turpentine. The starch yields material for the manufacture of resin. Similar conditions are present in the older wood. The resin mass eventually becomes so hard that it may be removed from the canal without breaking it (Fig. 4).

There is a continued increase of resin mass in the cells of old wood by the conversion of starch cells into resin cells. This is shown by the fact that old wood contains more resin cells than younger wood. A comparative investigation, however, affords no definite information as to when this process ceases.

The origin of the resin is, therefore, dependent upon the conversion of starch into a fluid mass resembling turpentine. Later it is diffused from the outer into the inner cells, where it undergoes further change and is converted into resin. The normal increase of resin is, therefore, supplied by the surrounding starch cells. The new supply of converted starch always passes on toward the inner cells of the group for the formation of resin.

The conclusions derived from this investigation are that the resin-containing elements in the wood of white fir can be conveniently grouped as follows:

1. *Resin Cells*.—Wood-parenchyma fibers (Hartig's cell-fibers) are usually scattered among the thin-walled trach-

eids, and invariably contain resin in old wood.

2. *Large Groups of Resin Cells*.—Large groups of elongated wood-parenchyma fibers containing resin are invariably surrounded by elements that may or may not contain resin in the older parts of the wood.

3. *Resin Canals*.—True resin canals are always surrounded by wood-parenchyma fibers that are invariably in communication with pith rays and contain starch.

The investigation also shows, first, that resin in the white fir originates in the wood-parenchyma fibers and that it never occurs normally in tracheids; second, resin is developed by the conversion of starch in wood-parenchyma fibers; third, that true resin canals are developed by the disorganization of cell-walls prior to the hardening of resin; and fourth, that the formation of resin canals must not be considered as a cause, but as a result of resin development.

EXPLANATION OF FIGURES

The illustrations are magnified 280 diameters and are slight modifications of those given by Dippel in *Botanische Zeitung*, 1863, p. 253. The abbreviations used with these figures are as follows: r. c., resin cells; st. c., starch cells; st. g., starch granules; r. p., resin passage; p. r., pith ray.

Fig. 1. Transverse section showing a small group of resin cells partly filled with a semi-fluid mass.

Fig. 2. Longitudinal radial section showing cells of a wood-parenchyma fiber containing starch granules.

Fig. 3. Transverse section showing a larger group of resin cells just inside thick walled tracheids of the late wood.

Fig. 4. Longitudinal radial section showing hardened resin in resin canal.

Fig. 5A. Longitudinal radial section showing resin passage with certain cells partly filled with resin.

Fig. 5B. Transverse section of a resin passage.

Fig. 6. Transverse section of a resin passage among the thin walled tracheids of the early wood.

Fig. 7. Transverse section of a resin passage in a young twig prior to the formation of resin.

Fig. 8. Longitudinal radial section of resin passage in young twig prior to the formation of resin.

Fig. 9. Longitudinal radial section of a resin passage, showing partially dissolved side and cross walls of the original resin cells.

THE NEW CANADIAN REGULATIONS

LUMBERMEN and paper and pulp manufacturers, as well as all users of print paper, are watching with much interest the action of Canada and of the Canadian provinces in the way of protection of the timber resources of the north country by means of regulations and prohibitions. The action of the provincial government of Quebec in prohibiting the exportation of pulpwood from the crown lands of the province was not unexpected, but the definite announcement of this action, coupled with the statement that it has been carefully considered and is not temporary or retaliatory, but is to be a permanent policy for the protection of the timber resources of Quebec has, as might be expected, been the subject of much discussion on this side of the line, especially in the trade journals.

The St. Louis Lumberman, after indicating quite fairly the strong reasons leading to the action of the Quebec authorities, nevertheless regards this action as a "petty and unfortunate exhibition of unneighborliness, following so closely on the heels of tariff negotiations by Canada," and thinks that under the circumstances it looks "like a bit of calculating, tricky politics." This journal believes that our paper mills will "discover that there are plenty of home woods that can be used in the manufacture of paper to the entire neglect of the Canadian spruce," and that "the Quebec prohibitions of pulpwood exports may, in the long run, prove to be a blessing in disguise for American paper mills and American forest owners alike."

The Paper Mill and Wood Pulp News is reserved in its expressions of opinion. Its Washington correspondent says "that the decision of the Quebec authorities is designed to benefit Canadian labor is the general belief of the Washington officials. Ultimately, they think,

it will result in the establishment of pulp factories in the province, thus reducing by so much the manufacture of pulp at American factories."

On the Canadian side of the line, opinion in regard to the Quebec prohibition is not unanimous, but as reflected by the leading Canadian trade papers it seems to be largely favorable. *The Canada Lumberman and Woodworker* finds the course of Quebec justified by the similar action of Ontario in 1897 in regard to sawlogs. It says:

It is to be hoped that the result will be the adoption of a definite policy of protection of the forest resources of the province from reckless exploitation in the interests of the consumers of a foreign country: If properly cared for, the forest resources of Quebec will provide a perpetual supply of pulpwood sufficient to furnish paper not only for the province itself, but for many outside markets. Undoubtedly history will repeat itself in Quebec and we shall see in the near future the establishment of large paper mills in various parts of the province, to turn into finished product the raw material which until now has been shipped to the paper mills of the United States.

Noting the dissatisfaction felt by the lumbermen of Quebec, in common with those of Ontario, at the coincident increase in stumpage dues and ground rent, by which the governments of these provinces seek to share in the unearned increment, this journal thinks the lumbermen may find their industry so greatly benefited by prohibition of export that "they will overlook the increase in the stumpage dues and ground rents." It continues:

Legislation prohibiting the export of pulpwood was not only necessary but imperative, if the industry was to be saved from extinction. United States paper mills have been for years the only industry to secure the benefit of Quebec's pulpwood. Naturally, the people who are interested in United States mills are now confusing the issue with their own political affairs. Paper manu-

facturers of the United States are accused of having contributed to the present situation by clamoring for a high protective duty upon paper, and for free import of pulpwood. It is argued along the same line that the prohibition of the export of pulpwood by Quebec is an act of discrimination against the United States which would justify the imposition of the maximum tariff, if it were not for the fact that the governments of both countries are now considering the feasibility of introducing a measure of reciprocal trade relations, which will perhaps include a settlement of the pulpwood question.

The people of the United States are drawing the wool over their own eyes in connection with this matter. If the action of Quebec in prohibiting the export of pulpwood were in reality an act of unneighborliness and not one of self protection, there might be reason for complaint on the part of the United States, but there is no question that the people of Quebec are adopting the only reasonable course for the preservation of their natural resources, and that, irrespective of any question of mutual good-will, it is imperative that this prohibition be continued even at the expense of the paper-making and publishing industries of the United States. The interests of the people of Quebec are paramount in the preservation of their own resources, and those who finally have to deal with the matter in the United States should be easily convinced of this.

That the action of Quebec was not influenced one way or the other by the tariff question is illustrated by the public utterances of Premier Gouin and several others of his government, who stated long ago that the present action would be taken before September, 1910. Premier Gouin, in making his announcement regarding the matter in the legislature, shed further light upon the situation by saying that the reason for his delay in making an announcement upon the subject was that he wished to avoid any interference with the tariff negotiations which have only recently been concluded.

In its issue of May 15, the same journal notes criticism of the prohibition ordinance both in the United States and Canada, saying of the latter

that there is only one criticism which "can reasonably be directed against the measure, namely, that the smaller owners of pulpwood in the province will be cut off from the United States market and will suffer heavy loss until mills can be built in Quebec to use their pulpwood." It believes, however, that the demand for paper and the advancing prices will lead to the building of mills without delay. The claim is made that this action has nothing to do with the "tariff tangle," but is a "direct development out of natural conditions." While "the loss to the United States newspapers, if it really becomes extensive, will be regrettable enough," the loss which "the people of Quebec are concerned in most closely is one which they have already submitted to for many years, *i. e.*, the loss of their own natural resources, and the permanent injury resulting from the placing of these resources under the control of a foreign people." It thinks the United States can have no ground for offense if Canada follows the course that has made the United States so prosperous.

This is directly in line with what AMERICAN FORESTRY has already said, that we cannot look to Canada to help out our diminishing timber supply, since our neighbor's resources are not so limitless as some suppose. We have already cited the opinion of a German government expert, sent to examine Canadian conditions, to the effect that Canadian forests can only take care of the home demand in the near future.

The Maritime provinces, it may be noticed, are taking steps to similarly protect their crown lands.



EDITORIAL

We Must Eliminate Waste

GOOD conservation consists no less in economies of operation than in the development and maintenance of sources of supply. This side of the question must come more and more to the front, for we have been sadly wasteful in all our operation and use of natural resources. To eliminate waste by greater care and economy and by more thorough and scientific methods must be our effort.

We find in several of the leading lumber journals frank admission of the fact that there is chaos in the field of production and distribution of lumber. This has been especially noticeable recently in discussions of the yellow pine situation. Over-production and wasteful milling throw upon the market a larger amount, especially of low-grade material, than the market really calls for. This surplus has to be "dumped" somewhere, at prices often not remunerative to the manufacturer, while the whole process is wasteful, unbusinesslike, and tends to unnecessary forest destruction.

Then there is the enormous factory waste so characteristic of much of our manufacturing. That suggestive magazine, *System*, in an article entitled "What Wanton Waste Means to You," points a moral here by naming two towns, one in Wisconsin and one in Michigan, which started on an equal basis but have separated on the high-road—one becoming a dead town, the other a live and prosperous one with a promising future. The difference lay in the spirit and method in which their resources were utilized. Both based their industries on the surrounding timber supply. One wasted its forest products in its mills so that the local supply became exhausted, and plant after plant had to shut down. There was left a waste country where once

had been productive forests, and, as the natural sequence, a moribund town.

In the Michigan town, on the other hand, a study was made of the utilization of waste and industries were developed with that in view. The first of these towns represents the old, careless spirit of a country over-rich with the bounty of nature, the second stands for the new, conserving spirit that is coming to the salvation of the country just before it is too late.

We are using ten times more lumber per capita than France and seven times more than Germany. We must not go on doing it. We must provide for the future, not only by increased production, but by eliminating waste.

In his thoughtful and instructive address at the biennial of the General Federation of Women's Clubs at Cincinnati, Mr. William L. Hall, of the Forest Service, emphasized this matter as one of the important and vital things in forest conservation, bringing facts and figures to support his position and indicating some of the steps that are being taken in the way of scientific experiments by the service to guide us in accomplishing the result.

Another recent address on this subject was made at the annual meeting of the National Lumber Manufacturers' Association, by Capt. J. B. White, who discussed from the operator's point of view the utilization of waste in forest and mill. This address was a real lumberman's gospel of good works. Captain White said that his subject led into the entire science of forestry. He pointed out how the production of wood must adjust itself to the conditions of the country, those regions, chiefly mountainous, which can do that to the best advantage, growing forests, while other regions blessed with a rich soil will produce the other needs of a civilized people, general profit arising from the interchange. This, it may be interpo-

lated, illustrates the national incidence of this whole question, because all sections alike have to use the forest products which not all may profitably produce.

Lumbermen, Captain White urged, should be as diligent in conserving forests and making their land produce a paying crop as farmers in studying the production of agricultural crops and the maintenance of soil fertility. We quote the following particularly suggestive statement:

In the south we are cutting over two and a quarter million acres of yellow pine every year, or about 7,500 acres every day, producing 13,000,000,000 feet of lumber each year, and twenty per cent waste makes the enormous sum of 2,600,000,000 feet of lumber. This means loss to the transportation companies in freight of 173,000 carloads each year, and at \$7 a thousand means an annual loss to labor of \$18,200,000. And in the entire Nation we are cutting 40,000,000,000 feet annually, leaving 8,000,000 acres a year of cut-over lands, and a total waste from unsalable low grades of at least 6,000,000,000 feet, or half a million carloads annually lost to the country. Add to this the estimated loss of \$50,000,000 by fires every year, and we have a total loss to the Nation and to the world of over \$100,000,000 per annum.

At this rapid rate of forest cutting, somebody will soon have to plant trees, and it is best that we should begin soon. There are doubtless localities in each state where some variety of trees can be produced more economically and profitably than other crops. Trees do not exhaust the soil, and they thrive on soil that has been exhausted by other crops. It is our duty to study forestry, our greatest prosperity is coming through the practice of wise methods, and it is the great privilege and duty of lumbermen to help lead in this great work, and not leave it to mere theorists and to impractical and unwise politicians to pass laws that will not only injure lumber manufacturers, but will injure the cause of forestry.

Referring to the prohibition of pulp wood exports from Canada, Captain White found this a text, also, for he held that we must meet such limitations of our supply by learning to utilize the waste of cottonwood, yellow pine, fir, hemlock, and other woods to make paper. In this connection there is an illustration given by the writer of the article in *System*, to which we have already referred. The New York and Pennsylvania company, which is pri-

marily a paper company, sends all its clear logs to the sawmill, making pulp from slabs, tops, and imperfect trunks. This problem of saving of waste is many-sided, as will be seen. While its fundamental principle is simple, it has an infinite variety of applications.

We can by reforestation and intensive forest cultivation make two trees grow where one grew before. This is a great work and must be done to supply the ever-growing demand. Moreover, it appeals to the sentiment and the imagination. But there is the other method of saving that we must also learn to practice of making one tree do the work that we have been accustomed to use two for. This is a homely method and does not appeal to the imagination at all, but it is a good practice and quite as necessary as the other. We must work at this thing from both ends. The first is the task of the state, the capitalist, and the land owner in varying degrees. The second is the task of every one who uses wood, and especially of the manufacturer, who handles it in considerable quantities. It involves the application of science, care, and industry.



The Forest Products Laboratory

WE PUBLISH this month the fullest statement that has yet appeared of the plans and purposes of the new Forest Products Laboratory at Madison, Wis. It was the coming opening of this institution that suggested the thought which is prominent in this number of *AMERICAN FORESTRY*—the prevention of waste—for it is that which is the reason for being of the new building and of the enlarged activities of the Branch of Products of the Forest Service, an enlargement which means much to the wood-using industries of this country.

The establishment of a completely equipped central station for testing and experimentation with the properties of wood gives such an opportunity as has not existed before to really know our wood resources "for all there is in them."

The institution of the new laboratory and of the corresponding statistical office in Chicago are further steps in the policy of dispersal of the activities of the Forest Service to bring them nearer to the people whom it serves. This will make the people better acquainted with the personnel and work of the service, from which knowledge will result, we believe, a greater understanding and better confidence. The first and greatest step in this direction was the establishment of the district offices in the national forest states, each with its district forester and full staff. This brings the workers nearer their work and nearer the people whom this work directly affects. The results have already approved the plan. There is increasing efficiency in the service and a much better feeling in the west for it.

Now comes the laboratory in Wisconsin and the office of utilization in Chicago. We are building up by degrees a great national forest administrative service which we have good reason to hope and expect will soon compare with any in the world.

The Forest Fire Season

THIS month we have given much space to the subject of waste and its prevention. Meanwhile dispatches in the newspapers from many sections of the country apprise us that forest fires, one of the most constant sources of preventable waste, are getting in their usual work and preparing the annual lesson which legislators are so unaccountably slow to learn.

And yet this legislative indifference is not so unaccountable when one thinks that it is only the natural reflection of the indifference of a large part of the community to a danger which the average citizen regards as remote and lacking in interest to him. It is a good piece of work for all of our forestry associations to educate the public to the general economic importance of this matter. That is the best way to break down legislative indifference.

The annual loss from forest fires cannot be put into figures. All attempts to reduce it to statistics have proved inadequate and unsatisfactory. Estimates of loss are seldom supported by sufficient knowledge and judgment on the part of the estimators, and the great damage to the future that may be done even by a ground fire that destroys little actually existent and available property is outside of statistical computation. We can see, however, without exact figures, the terrible results of the burns that not only destroy standing timber and all property in their path, but affect for years the productive capacity of the soil and set back often for a generation the young growth.

This is a form of waste that, if not absolutely preventable, can be reduced to an inappreciable minimum, and must be if our forestry work is to be made practicable. The cost will be no greater proportionally than that involved in the protection from fire of town and city property. Prevention is easier in the case of the forest, because man is the uncertain element in the fire problem, and the human conditions are much simpler in the forest than in populous communities.

Insurance of forest property can only be obtained at prohibitive rates under present conditions, and prudent men hesitate before entering upon long-term investments in property that is protected neither by insurance nor by adequate exercise of the state's police power. States and municipalities recognize their obligation to protect all other property from fire and other perils. The owner of a stand of timber who holds it in good condition certainly deserves as well of his community as the man who salts his property down in stocks and bonds. Furthermore, as a property owner and, under present laws, an inequitably burdened taxpayer, he has a right to claim protection.

In the May number of this magazine, Mr. Gaskill showed us how New Jersey is directing its forestry work at present solely against the fire evil, believing that other things will take

care of themselves if that is well attended to. This may be an extreme attitude, but there is much reason in it, and if the state can only handle properly one phase of the question, that is the one that demands first consideration.

We cannot expect much private forestry until we make forest property as reasonably secure as other property.

A Powerful Ally

IF WE may judge from the reports of and comments on the great meeting of the National Lumber Manufacturers' Association at New Orleans in April, that gathering was most significant in its serious consideration of the larger problems of lumbering and forestry. The purely commercial questions that have largely occupied our business associations of this kind seem to have been markedly subordinated. *The Southern Lumbermen* expresses this at the beginning of its report of the meeting when it says:

The striking feature of the eighth annual meeting of the National Lumber Manufacturers' Association held here at the Grunewald Hotel yesterday and to-day, was the fact that the excellent papers which composed the program and the general trend of discussion were not directly along the lines of a study of sales methods for the marketing of forest products, but rather for the conservation of timber and a complete utilization of all forest products. It might well have been mistaken for a conservation meeting, as that was the subject that was most discussed, and with it the discussion of timber land taxation, which is so closely allied to the subject of conservation. It was the sense of the body that the present system of taxation is in many respects deficient and unjust, and that some action should be taken leading toward a more equitable system of taxation.

The two addresses which seem to have aroused the most active interest were those by Forester Graves on private forestry, on which we commented last month, and by Professor Fairchild on the taxation of forest lands.

President Hines, in his annual address, emphasized the importance of forest conservation to the lumberman

and its national bearings, which make it primarily a matter for a national association to deal with rather than the local affiliated bodies. "One reason for this," he said, "is that under the present protective system practically every timber section is in more or less direct competition with every other section, and if costly restrictions and duties are placed upon the lumber manufacturers of one state, they are placed at an artificial disadvantage with their competitors in another state." In view of this fact, he announced the establishment by the board of governors of a conservation committee of the association, headed by Capt. J. B. White. "Under the guidance of the able chairman of this committee," President Hines promised, "the lumbermen of the country will be placed in their proper light in the front ranks with this new handling of conservation on enlightened and practical lines, and must be recognized by those theorists who profess to be the only conservationists." This declaration from such a source is assurance that the cause of forestry is at last coming to its own and perhaps the theorists have had something to do with bringing this about.

President Hines mentioned among the subjects for this committee the treatment of cut-over lands, requirements as to cutting, diameter limits of cutting, and replanting, remarking that in some states propositions have been seriously considered which are absolutely impractical. The following statement made by him is significant and shows a wise grasp of the situation:

Many lumbermen might like to have all these subjects dismissed, but it is my conviction that the conservation movement has gone so far that it cannot be stopped, but its direction can be controlled somewhat and practical ideas and methods can be insisted upon by us.

He also spoke briefly and forcibly of the tax question as one of the utmost importance. In this sentence he describes a fundamental difficulty in the tax situation, especially in some of our more conservative states: "One great trouble with the present method of tim-

ber land taxation is that most states make no distinction between the different classes of property, their value to the community, and the effect of taxes upon them. The timber owner cannot be a timber grower under present conditions." He announced the conclusion of the board of governors and the conservation committee that so far they found the best plan to be to levy the tax only when the timber was cut, when a full tax would be levied, but it would be so definite that it could be figured in estimates of cost. They believe that so long as the owner keeps land in growing timber there is no reason why he should be taxed. This, by the way, is the plan that is advocated by Professor Fairchild of Yale, who has studied this problem more thoroughly, perhaps, than any other economist or forester in this country.

All through the meeting ran this awakening interest in practical, working forestry, the kind that every sincere conservationist, whether theorist or not, wishes to see. It appeared in nearly all the reports and many suggestions were made looking to effective action. Unquestionably, our foresters and lumbermen are getting together and something is sure to be accomplished when forestry secures such support as that which a powerful organization like the National Lumber Manufacturers' Association can give it.

The Women's Clubs and the Forests

THE support of the women of America is a powerful aid to any cause. This is such a truism that it seems unnecessary to have uttered it, but it suggests some thoughts concerning the connection of the federated women's clubs of the United States with the forestry and conservation movements. These clubs have shown a splendid public spirit in taking up many of the great movements for national betterment. But there is much danger that this inclusiveness of interests will be attended with some vagueness of thought and action. We beg the women to guard against this, and to keep their thought on every subject they take up clear and direct, and their action posi-

tive and based on well matured judgment.

Forestry and conservation seem to make a special appeal to the women, and their clubs are laying increased emphasis upon this work. This is a fine thing for the movement. It means that this question will get into the homes of America and be brought to the children by the strongest influence they know. It is, we believe, especially necessary in these fields that clear thinking should be secured through sufficient knowledge. Much harm has been done in the course of the forestry movement, and the same is true of all branches of conservation, by immature thought arising from insufficient knowledge. To know whereof we speak must be our constant care. Now, if we may venture suggestion, the women's clubs sometimes undertake too much and gain only that little knowledge which is a dangerous thing, on subjects they take up. This produces mental dissipation in the individual which is unfortunate, but when it is applied to the advancement of a great public cause resting on a scientific foundation, it really becomes serious.

Therefore, we say to the clubwomen of America, your support is the most welcome that could come to our work, but in order that you may accomplish what you yourselves desire, be earnest, sincere, and thorough in every undertaking, and study these forest and conservation questions so that you can give sound reasons for the faith that is in you.

The great biennial meeting at Cincinnati showed clearly not only that the clubwomen are taking up forestry and conservation with the greatest enthusiasm, but that under wise leadership they are more and more developing thorough methods of action. Mrs. Gerard and Mrs. Brooks in the national committee, Mrs. Tucker in Massachusetts, Mrs. Mautner in Michigan, Mrs. Maury in Kentucky, Mrs. Avery in Louisiana, and many others who might be named, have given excellent examples of the right spirit and method, and through the influence of these women and others like them, we hope to see this work in the Federation brought to a high state of efficiency.

AS OTHERS SEE US

Translated from the *Revue des Eaux et Forêts*, February 15, 1910

THE recent dismissal of Mr. Gifford Pinchot from the Forest Service of the United States Department of Agriculture makes timely a reassuring word as to the high state of efficiency, stability, and encouraging prospects for the future which this able man has contributed to the government work in forestry and to the science in general in America. A statement of the actual results accomplished during the eleven years of Mr. Pinchot's service is a tribute to the ability of any man under the best of conditions, but no adequate description can be given of the tremendous prejudices and difficulties under which he worked and which his foresight and perseverance enabled him to conquer, nor of the tremendous revolution in popular thought, from reckless improvidence to conservative economy which his administration has brought about.

When Mr. Pinchot began his service as Chief of the Division of Forestry, he was "a forester without a forest." The government forest reserves, then comprising 42,000,000 acres, were practically unmanaged. Land laws designed to encourage settlement throughout the west made easy the fraudulent as well as the legitimate but wasteful exploitation of timber over great areas, while year after year fires ran through the poorly protected reserves, not gradually, but rapidly destroying their productive value. The duties of the Division, later the Bureau of Forestry, were purely advisory. Now, all this is changed, even to the name of the bureau. From a small division of thirteen men, not more than four of whom were technically trained foresters, the Forest Service has become an administrative force of over 2,000 men, with control over some 195,000,000 acres of land.

The "Forest Reserves," from which only dead timber could be cut, are now National Forests, which already yield nearly 400,000,000 board-feet of mature as well as dead timber per year, the cutting of which is done according to plans prepared by technically educated men. The employment of such men has led to the rapid growth of forest schools from two, at the time of Mr. Pinchot's accession to office, to twelve at the present time. This, together with the awakened interest of practically all the eastern and some of the western states in their own forest resources, has brought forward the subject of conservation as a great national issue.

The United States embraces so varied a range of climatic, topographic, and forest conditions that scientific experiments performed upon them cannot help but be of service to the cause of forestry almost throughout the northern hemisphere. Hitherto, America has come to Europe for her ideals, her examples, and to a large extent her methods of forest practice. Europe, on the other hand, has found in America some of her most beautiful and promising timber species. The work of Schwabach and Mayr, among others, brings out the fact that European foresters already take no small interest in American species. With the establishment of forest experiment stations brought about during Mr. Pinchot's term in office, the time is without doubt drawing near when the United States can supply to the world not only species but also technical information, based on thorough scientific experiment. The initiation of experimental methods, perhaps more than any other one feature, illustrates the great advance during recent years of forestry in America.

While Mr. Pinchot's departure is undoubtedly a loss to the Forest Service, the structure in the building of which he has been so largely responsible rests on too solid a foundation to be seriously disturbed. The need for a successor who should be above all a technical forester has become apparent. Prof. Henry Solon Graves, director of the Yale Forest School, has received the appointment to this position, and the nation may well be congratulated upon the choice. Professor Graves brings to the work the benefit of wide experience in forest practice in the United States,

supplemented by European study. He is thoroughly in sympathy with the system built up by Mr. Pinchot, with whom he has formerly served. Under his administration and with the increased appreciation of the necessity for forest conservation which has grown up, the future of forestry in the United States is assured. The technical problems in need of solution are many, but the impediments to their solution are now largely removed or in process of removal. Economics, not politics, will determine the future of American forestry.

CURRENT LITERATURE

REVIEWS

American Inland Waterways: Their relation to railway transportation and to the national welfare; their creation, restoration, and maintenance. By Herbert Quick. With eighty illustrations and a map, pp. xx, 241. New York and London: G. P. Putnam's Sons, 1909. Price, \$3.50

This handsomely typed and printed volume surprised the reviewer by its unflagging interest. The subject is treated with broad grasp and clear insight, not with any pet project in mind, but with a fine sense of proportion and of the inter-relation of various projects forming the whole of a true national conservation policy. From the first chapter on "The Grand Strategy of Trade" to the last on "The Battle of the Engineers," which brings the book almost up to the minute, the attention of the reader is held by the author's rapid, well integrated array of facts and arguments.

The strategic relation of waterways and trade, a comparison of the work done in Europe with our own arrested development on these lines, is the first point brought out, and it is made with great force, emphasized by effective facts and examples. In his chapter on "Bringing the Sea to the Farms," Mr. Quick shows the significance of waterway transportation to our rich agricultural interior, and treats especially the development of the Mississippi River system of waterways. In this connection he discusses quite frankly the problem of turning the waters of the Lakes Mississippiward. He recognizes the vastness of the Mississippi project, its diffi-

culty, and its cost, but he thinks this need not stagger us since the end to be attained is commensurate.

The historic competition between the railways and the waterways is the subject of an interesting chapter. The keynote to the argument on this phase of the subject is found in the following sentences: "And yet the railways should not desire the extinction of water-borne traffic. All over the world they have extinguished it so far as possible, but there is no basic reason for this antagonism. Of surface, shortsighted reason there is plenty. Waterways regulate and control rates on competing railways, but at the same time they powerfully promote the prosperity of the very roads with which they compete. Paradoxical as this may sound, to railway men especially, the transportation specialist (which the average railway man is not) knows that this is true, and understands the reason."

In discussing the need of new railway facilities to handle the business of the country, the author says we need from 75,000 to 120,000 miles of track, and so many new cars and engines that there is not enough iron in the country to meet these needs—and, he might have added, nor wood enough to tie the tracks.

There is a long and ably worked out chapter on the neglected subject of terminals, showing how much better this matter is handled abroad, and how our railways in their policy of suppressing water competition have closed the gates by monopolizing the water-fronts at strategic points. To quote again

one of the striking statements with which the book abounds: "There is good reason to contend that the federal government should insist upon an adjustment of the matter of terminals all along every such waterway before spending the people's money upon it; for a waterway with monopolized banks at the ports is a gift to the owners of the water-front. The time to acquire rights for the public is before the highway is completed. To wait is, first to make a road for trade, and then pay for it over again to the owners of abutting land. The right of the railways to handle their terminal business to the destruction of waterway trade may well be considered; and, in a general way, the effects of terminals on water transportation should be worked out while there is yet time."

With his fifth chapter on "Rivers and the Conservation Movement," the author begins to link the waterways with the other problems of conservation and especially with forestry. In this and the following chapters he shows his breadth of view. He does not advocate simply a project or group of projects. The big national self-preservation and development problem is before him. He presents the case for Mr. Leighton's scheme of reservoirs for regulating streamflow, not as a lonesome scheme, but as an ally of mountain forests maintained for the same purpose; a part of a big system, as it really must be to be effective. The Southern Appalachian and White Mountain project appeals to Mr. Quick as one of the first needs for the waterways and the case is argued clearly and forcibly from this point of view. Here, again, is a statement that embodies a good deal of conservation philosophy: "The old scientists divided nature into the four elements of earth, air, fire, and water. We have seen how, in matters of coal consumption, forest destruction, power waste, flood damages, soil waste, and the like these four react on each other. We have begun to see that we cannot allow them to ravage the world unchecked. The time must come when he who cuts a tree must ask permission of the rest of the world, and he who burns coal must first prove that there is no way of doing the work by waterpower. A muddied stream, carrying off the richest of the soil, will be proof of crime in the community whence comes the silt; and all over the land will be found the reservoirs—small and great—from which in drought will flow the waters to make all our rivers navigable. In those days the 'blight of continental distances' will be removed. From Pembina on the north, Great Falls on the northwest, and Sackett's Harbor on the northeast, down to the Gulf, will run the new seaboard, and the same ships will ply the lakes in summer and carry cargoes to the tropics in winter. In a hundred streams now useless will run the regulated flow that will carry commerce, and, save in exceptional cases, every town in the land will have its waterway to the sea." Whether this dream can be fully real-

ized in all of its details or not, the principle in the author's mind is sound.

The closing chapter of the book, on "The Battle of the Engineers," reviews in an impartial way the discussion that has been in progress for some time, and with which our readers are quite familiar, on the effect of forests on streamflow. After a review of all the testimony, the author finds that perhaps the best summing up is contained in the comment of the Wisconsin lumbermen on Colonel Chittenden's noted paper: "Why, a man doesn't need any learning to know that forests protect the hills from washing and regulate the flow of streams. All he needs is common sense."

The appendix contains citations of value for reference. Finally, we should say that this is distinctly a popular book on a great subject, and a book that is worth while for the reader. Indeed, we do not know of any book that will give the non-technical reader so good a general view of the most vital points of conservation of natural resources in the United States, and of the big far-reaching principles underlying them, with, of course, especial emphasis on the waterways.



The Care of Trees in lawn, street, and park, with a list of trees and shrubs for decorative use. By Bernhard E. Fernow, Dean of the Faculty of Forestry, University of Toronto. Illustrated, pp. x, 392. New York: Henry Holt & Co., 1910. Price, \$2.00

This new book from Doctor Fernow's pen answers the description of a well-worn phrase in that it really fills a long-felt want. It is much of a surprise to see the author's name on a book of this character, but in his preface he shows that he, like others having to do with forestry work, has had to meet inquiries which showed an urgent demand for a comprehensive book of this kind. Not every one has anything to do directly and personally with forestry, but there are hosts of people concerned with the care of trees, yet with all the agitation concerning trees and all the interest in them which has been aroused in recent years, there has been nothing published comprehensive and practical in regard to the care of trees for shade and ornament based on scientific study. The nearest approaches to such a manual were a pamphlet monograph by the late Colonel Fox, superintendent of state forests of New York, and bulletin No. 125 of the Massachusetts Agricultural Experiment Station, issued by the station and the Massachusetts Forestry Association in cooperation about two years ago. The latter was called forth by a pressing local demand and a large edition was very promptly exhausted, but this publication was only a pamphlet and was adapted primarily to Massachusetts conditions, especially in its consideration of the shade-tree law.

Doctor Fernow's volume is a substantial one, comprehensive in substance and well illustrated. In his introductory chapter the author disclaims the presentation of new knowledge. His book, he says, is "mainly a compilation of the well-known facts which bear upon the subject." In his arrangement and inclusion of material, the author acts upon the belief "that a knowledge of the nature of trees, is necessary to care for them properly." In view of Doctor Fernow's scientific habit of mind, we are not surprised to find him making a very important distinction which is often lost sight of: "The care of shade and ornamental trees is an entirely different matter from the care of forests. It is unfortunate that the distinction has not always been clearly perceived. The object of forestry is the substance of the tree; only when the tree is cut and its wood utilized, is the object of the forester attained; he grows trees, *not* to be preserved, but to be *harvested*. Hence, to call the tree-wardens of towns and cities 'foresters' is a misnomer. The tree that satisfies the forester is most unsatisfactory to the landscape gardener or street planter, and *vice versa*. The latter arboriculturists are after shade or beauty of form, hence their treatment of trees is entirely different from that of the forester, although, to secure the object in either case, the nature and life history of trees must be understood. On the other hand, no more fitting title, no better description of the duties of those who are set to care for our roadside trees or our city trees in street and park could be invented than that of 'tree warden,' a most expressive, dignified, and honorable designation."

In the second chapter the characteristic structure and life of trees are considered, the subject being presented in a simple, non-technical way. There are two chapters on diseases of trees. The first is a general discussion of old age, general causes of disease, fungus diseases, and damage by insects. The second is devoted to diagnosis of diseases, treating insect damage, fungus, and bacterial diseases, physiological diseases, effect of soil conditions, atmospherical influence, obnoxious gases, electric currents, light conditions, and mechanical injuries. The next chapter is an important one, covering the field of control of physiological diseases and treatment of mechanical injuries, and the general care of trees. Here are considered such topics as soil improvement, fertilizing, grading, pruning and trimming, manner of operation, callusing and repairing, treatment of street trees, care of aged trees, and quack medicines.

In connection with this last chapter, we note one omission. There are numerous cuts illustrating most of the types of tree tools, and there is a page of comment upon them—too little, perhaps, for a subject upon which

the amateur at least needs specific information. But this paragraph, although it has a heading, is not included in the synoptical contents, nor is a reference found in the index.

In the too brief paragraph on quack medicines we do not find mention of the proved fact, which Professor George E. Stone, of the Massachusetts Agricultural College, has discussed at length, of the injuries to trees from banding substances, nor does Doctor Fernow mention this. Doctor Stone has shown that several substances on the market for banding are distinctly injurious and should be avoided.

Chapter six deals with the control of parasites, that great army of fungus and insect enemies that preys in these days on nearly all of our most valued ornamental trees. This is a most important subject and is treated briefly, but perhaps as adequately as could be expected in a general work not devoted to this particular subject. There is a very valuable chapter on "Care in Planting Trees," a subject on which the author is quite at home. It is treated clearly and concisely. There is a short chapter on "Esthetic Forests, or Woodland Parks," an interesting field of discussion in which the forester, the landscape gardener, and the tree expert come together on a common ground in which the functions of each are not clearly separated. There are 126 pages devoted to the choice of plant material. This matter is very helpful. It consists of practical suggestions regarding the selection of the most desirable trees and shrubs and with this a list of trees and shrubs, with brief descriptions and notes. The author explains this chapter at its beginning by saying: "Although this book is not designed to be a guide in the laying out and planting of grounds, it seemed, nevertheless, germane and desirable to add a chapter on the selection of plant material, inasmuch as the after care is to some extent influenced by the original choice of trees." The list seems to be well selected, conveniently arranged, and contains in very concise form the most important information on the shade tree required by the planter and gardener. The book has quite an extensive index, although beyond the omission which has already been noted we have not examined it as to completeness. There is also a brief list of books on related subjects. This list contains twenty-six separate titles and a number of general books on landscape gardening, which are grouped together. Most of the titles are those of bulletins published by United States experiment stations, but there are a few larger and more complete volumes.

We are very glad that this book has been provided for the use of tree lovers. It was much needed, and it is very fortunate that an authority like Doctor Fernow could find opportunity to fill this need so satisfactorily.

MONTHLY LIST FOR MAY, 1910

(Books and periodicals indexed in the Library of the United States Forest Service)

NOTE.—A list of current literature will appear regularly in American Forestry in the future, as a continuation of the lists which have been issued monthly by the Forest Service since February, 1904.

Forestry as a whole

Proceedings of associations

University of Nebraska—Forest club. The forest club annual, vol. 2, 1910. 114 p., plates. Lincoln, Nebr., 1910.

Forest aesthetics

Street and park trees

Fernow, Bernhard E. The care of trees in lawn, street, and park, with a list of trees and shrubs for decorative use. 392 p., illus., plates. New York, Henry Holt & Co., 1910.

Hall, Harvey Monroe. Studies in ornamental trees and shrubs. 74 p., illus., plates. Berkeley, Cal., 1910. (University of California. Publications, botany, vol. 4, no. 1.)

New Jersey—Forest park reservation commission. The planting and care of shade trees. 82 p., illus., plates. Paterson, N. J., State printer, 1909.

Phillips, T. Glenn. City tree planting; the selection, planting, and care of trees along city thoroughfares. 26 p., illus. Detroit, 1910. (Detroit city plan and improvement commission. Report no. 1.)

Forest education

Cary, Austin. Outline for lectures on forestry. 12 p. Albany, 1910. (New York—Forest, fish and game commission. Bulletin 5.)

Arbor day

Kellogg, Alice M. How to celebrate Arbor Day in the schoolroom. 96 p. Philadelphia, Penn Publishing Co., 1907.

Forest schools

University of Minnesota forest school—Iasca summer school. Prospectus, 1910. 24 p., illus. Arago, Minn.

Forest legislation

Hirst, E. C. Forest laws of New Hampshire. 18 p. Concord, N. H., 1909. (New Hampshire—Forestry commission. Bulletin 1.)

Forest description

India—Madras presidency—Forest department. Reports on certain continental forests, by F. L. Cowley-Brown. 83 p., illus. Madras, 1908.

Thompson, H. N. Gold coast; report on forests. 238 p., illus., map. London: Wyman & Sons, 1910. (Colonial reports, miscellaneous, no. 66.)

Whitford, Harry Nichols. Studies in the vegetation of the Philippines: 1. The composition and volume of the dipterocarp forests of the Philippines. 27 p., plates. Manila, Bureau of science of the Philippine government, 1909.

Forest botany

Trees: classification and description

Graves, William Elliott. Studies in eucalyptus. 96 p., illus. St. Louis, Eucalyptus timber corporation, 1910.

Maiden, J. H. The forest flora of New South Wales, pt. 38. 22 p., illus. Sydney, N. S. W., Government printer, 1910.

Maury, Sarah Webb. Native trees of Kentucky; a handbook. 140 p., illus. Kentucky federation of women's clubs, 1910.

Rogers, Julia Ellen. Trees that every child should know; easy tree studies for all seasons of the year. 263 p., plates. New York, Doubleday, Page & Co., 1909.

Woods: classification and structure

Troup, R. S. Petwin or trincomali wood, *Berrya ammonilla*. 8 p., plate. Calcutta, 1910. (Indian—Forest department. Forest pamphlet no. 12.)

Silvics

Forest influences

Ashe, W. W. Special relations of forests to rivers in the United States. 21 p. Washington, Government printing office, 1909.

Ecology

Warming, Eugenius & Vahl, Martin. Ecology of plants; an introduction to the study of plant-communities. 422 p. Oxford, The Clarendon press, 1909.

Silviculture

Planting

Langdell, R. S. Forest nursery and reforestation work in Massachusetts. 36 p., plates. Boston, State forester's office, 1910.

Macoun, W. T. Culture des arbres forestiers en pépinière. 36 p. Ottawa, C. H. Parmlee, 1909.

Morris, O. M. Tree culture. 35 p., illus. Stillwater, Okla., 1910. (Oklahoma—Agricultural experiment station. Bulletin 86.)

Forest protection

Schenck, Carl Alwin. Forest protection; guide to lectures delivered at the Biltmore forest school. 159 p. Asheville, N. C., The inland press, 1909.

Insects

Stebbing, E. P. The blue pine "polygraphus" bark-borer. 7 p., illus. Calcutta, 1910. (India—Forest department. Leaflet no. 5.)
Stebbing, E. P. The larger deodar bark-borer. 12 p., illus. Calcutta, 1909. (India—Forest department. Leaflet no. 4.)

Fire

Hall, W. C. J. and O'Hara, B. L. Treatise on the protection of forests from fire. 31 p., plates. Quebec, Department of lands and forests, 1909.

Forest management

Ashe, W. W. The farm forests of Virginia and recommendations for their improvement. 12 p. Richmond, Va., State board of agriculture, 1910.
Ashe, W. W. Forest conditions in Virginia and proposed measures for forest protection. 20 p. Richmond, Va., Superintendent of public printing, 1910. (Virginia—General assembly—House. Document no 5.)

Forest mensuration

Baughman, H. R. A. Baughman's buyer and seller. 8th ed., 293 p. Indianapolis, Ind., The author, 1906.

Forest organization

Caccia, A. M. F. Tables showing the progress in working plans in the provinces outside the Madras and Bombay presidencies up to the 31st December, 1908. 44 p. Calcutta, 1910. (India—Forest department. Forest pamphlet no. 9.)

Forest administration

India—Andaman Islands—Forest department. Progress report of forest administration, 1908-9. 23 p. Calcutta, Superintendent government printing, 1910.
India—Baluchistan—Forest department. Progress report of forest administration in Baluchistan for 1908-9. 41 p. Calcutta, Superintendent government printing, 1909.
India—State board of forestry. Ninth annual report, 1909. 88 p., illus. Indianapolis, Ind., 1910.

Massachusetts—State forester. Sixth annual report, 1909. 109 p., illus. Boston, Mass., 1910.

New Jersey—Forest park reservation commission. Fifth annual report, 1909. 56 p., illus. Trenton, N. J., 1910.

Orange River colony—Department of Agriculture—Forestry division. Fifth annual report, 1908-9. 56 p. Bloemfontein, 1909.

Quebec—Department of lands and forests. Report for the twelve months ending 30th June, 1909. 202 p., plates. Quebec, 1910.

Forest economics

Statistics

Alsace-Lorraine—Abteilung für finanzen, handel und domänen. Beiträge zur forststatistik von Elsass-Lothringen, heft 27, 1908. 124 p. Strassburg, 1910.

Forest utilization

Beauverie, Jean. Les bois industriels. 420 p., illus. Paris, Octave Doin et fils, 1910.

Lumber industry

National lumber manufacturers' credit corporation. Credit rating book, 13th volume, April, 1910. 102 p., maps. St. Louis, Mo., 1910.

Wood preservation

Wood preservers' association. Proceedings of the 6th annual meeting, 1910. 168 p. Galesburg, Ill., 1910.

Auxiliary subjects

Conservation of natural resources

Titsworth, Frederick S. Notes on the legal aspects of the conservation problem. 20 p. Denver, Colorado scientific society, 1910.

Grazing

Griffiths, David. A protected stock range in Arizona. 28 p., plates. Washington, 1910. (United States—Department of agriculture—Bureau of plant industry. Bulletin 177.)

Geology

Hayes, C. W. Handbook for field geologists. 159 p., illus. New York, John Wiley & Sons, 1909.

Periodical articles

General

Annals of the American academy, March, 1910—National forests as recreation grounds, by T. Cleveland, p. 241-7; For-

- estry policy of New York, by A. Cary, p. 248-51; Forestry policy of Pennsylvania, by J. T. Rothrock, p. 252-9; State forests in Michigan, by F. Roth, p. 260-5; Southern Appalachian park reserve as a national playground, by G. T. Surface, p. 401-8.
- Annals of botany, January, 1910—Transpiration and the ascent of water in trees under Australian conditions, by A. J. Ewart and B. Rees, p. 85-105.
- Country Life in America, April, 1910—Two rather neglected trees, by H. S. Adams, p. 758; How to destroy boring insects in shade trees, by J. J. Levison, p. 776; River driver of Quebec, by A. W. Dimock, p. 683-7.
- Gardeners' chronicle, February 12, 1910—The catalpas, by J. Clark, p. 100; Street trees, p. 101.
- Independent, March 31, 1910—Why east and west differ on the conservation problem, by L. M. Scott, p. 697-9.
- Minnesota horticulturist, April, 1910—Norway poplar as a lumber tree, by A. V. McNeil, p. 134-9.
- North American review, April, 1910—Other side of conservation, by G. L. Knapp, p. 465-81.
- Outlook, March 26, 1910—Water savers, by W. V. Woehlke, p. 659-67.
- Putnam's magazine, April, 1910—Reclaiming the Everglades, by S. M. Ball, p. 796-802.
- Review of reviews, April, 1910—The advance of forestry in the United States, by H. S. Graves, p. 461-6.
- Scientific American, February 26, 1910—The Cochiti forest railway, p. 184-5.
- Scientific American supplement, March 26, 1910—The artificial silk industry; converting wood into silken fabric, by W. P. Dreaper, p. 194-5.
- Scientific American supplement, April 16, 1910—Alcohol from wood waste, by R. F. Ruttan, p. 242-3.
- Shield's magazine, April, 1910—The effect of deforestation on bird and fish life, by J. M. English, p. 209-11.
- Torrey, April, 1910—The eucalyptus trees of California, by J. Broadhurst, p. 84-9.
- United States monthly weather review, January, 1910—Work undertaken at the Fremont forest experiment station in climatology and forestry, by L. H. Dangerfield, p. 97-101.
- Western empire, April, 1910—Eucalyptus culture, p. 17-19.
- World's work, May, 1910—How planting trees saved Jutland, by W. Hovgaard, p. 12976-9.
- Trade journals and consular reports*
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EDUCATION

Harvard Students to Work in New Hampshire

Blue Mountain Forest Park, in Sullivan County, New Hampshire, has been made available for the Harvard School of Forestry. This is the famous Corbin property, where for years the finest buffalo herd in the United States was maintained. The tract, which covers about 30,000 acres, has for some years been under careful management by forestry methods and offers an excellent opportunity for practicing the rougher methods used in unorganized country.

Through the courtesy of the owners, the second-year students of forestry will go to the park this month for the first field work.

This is an important addition to the already admirable facilities for practical work of the Harvard Forest at Petersham.

Forestry Education in Louisiana

Governor Sanders, in his message to the general assembly, urges that the law authorizing a chair of forestry in the state university be made effective. In view of the importance of its timber to the state and the rapid destruction which is going on, it seems none too early to begin the education of the students of the university in a science than which none is more important to the state's welfare.

University of Georgia Summer School

The summer camp of the School of Forestry of the University of Georgia will open June 20 and close August 20. It will be located in Alachua County, Florida, on a tract of 50,000 acres that has been placed at the disposal of the school by B. F. Williamson, of Gainesville. Lumbering and turpentine operations are in progress on the tract. Any student of the University of Georgia or any male person eighteen years of age who has sufficient education to profit by the courses may be admitted. The courses of study will include forest botany, silviculture, protection, measurements, lumbering, and utilization.

Michigan Agricultural College

All the junior students in forestry have appointments for the summer in the western national forests. It has been Professor Baker's plan to scatter the class over as large an area as possible in order that the maximum variety of conditions may be studied by members of the class. Each student will study the conditions that he meets with in his location and will make a report before the entire class upon its reassembling at the college next September. The students will receive \$75 per month, but the great advantage of the work will be the experience.



NATIONAL FOREST WORK

Forest Planting in the Semi-arid West

In the *Dry Farming Bulletin*, Smith Riley, district forester, makes the following report on planting experiments at Akron, Colo., and Bellefourche, S. Dak.: "The Forest Service is conducting planting experiments at dry farming experiment stations at Akron, Colo., and Bellefourche, S. Dak. The work at Akron is in cooperation with the Colorado Experiment Station and that at Bellefourche in cooperation with the Bureau of Plant Industry. While the agreements for this work were perfected in 1907, the actual work of planting did not begin until the spring of 1909.

"The object of the cooperative experiment work is to increase the knowledge concerning trees suitable for planting in the plains region of South Dakota, Colorado, and other similar localities, to test methods of spacing,

mixtures, and influence of cultivation on forest plantations; the ultimate purpose being to serve as an object-lesson to the settlers in methods of establishing windbreaks, shelterbelts, and woodlots, and the most desirable trees to use for each purpose.

"The provisions of the agreement in connection with this experimental work are that the Forest Service provides plant material and pays for labor necessary in preparing the land and planting the trees and for care and cultivation for a definite period after they are set out. The cooperator with the Forest Service is to furnish the land and the necessary supervision to carry out the plans of the experiment.

"Last spring 3,700 trees were planted at the Akron experiment station, and the following table indicates the species and the results obtained:

Table Showing the Result of Experiment Planting at the Akron Substation, Akron, Colo., 1909

Species	Class of stock	Number planted	Per cent alive	Growth past season	Length of growing season	Present condition
Honey Locust.....	18-24-inch seedlings	350	95	1 foot	4 months	Good
Green Ash.....	18-24-inch seedlings	500	88	1/4 foot	4 months	Good
Osage Orange.....	No. 1 seedlings	330	40	3/4 foot	4 months	Poor
Cottonwood.....	One year	85	50	4 feet	4 months	Good
Black Cherry.....	18-24-inch seedlings	165	40	2 feet	4 months	Good
White Elm.....	18-24-inch seedlings	825	92	2 feet	4 months	Good
White Ash.....	12-24-inch seedlings	330	77	1 1/2 feet	4 months	Poor
Black Locust.....	One year	133	66	2 feet	4 months	Good
Russian Mulberry.....	24-48-inch seedlings	500	90	1 3/4 feet	4 months	Good
Russian Wild Olive.....	12-24-inch seedlings	500	40	1 1/2 feet	4 months	Good
Total.....		3,718				

"It will be noted from the foregoing table that with the exception of osage orange, cottonwood, black cherry, and Russian wild olive, the results were very satisfactory. The poor results of these species, however, are probably due to the bad condition of the stock when received from the nursery. The trees in this experiment were given as careful attention as any of the cultivated crops that were grown at the experiment station. The trees were given two shallow and three deep cultivations and were hoed twice during the season.

"This spring approximately 5,400 trees are to be planted in two windbreaks at the Akron experiment station. The trees to be used are the most common hardy varieties of broadleaf species and are honey locust, green ash, white elm, black locust, Russian mulberry, and hackberry. In addition to the windbreak planting, variety tests are to be made with seven different conifers in lots of 100 each, these species being European larch, Austrian, Scotch, jack, and yellow pines, Douglas fir, and Black Hills spruce.

"The cooperative planting at the Bellefourche Experiment station has not been planned as extensively as that at Akron. All the planting in connection with the dry farm work was done in the spring of 1909 when 3,400 trees were planted. The species, quantity of trees used, and the results obtained at the Bellefourche Station are indicated in the following table:

so as to form complete stand and test out thoroughly the development of the various species under these conditions.

"The experimental plots were given the very best of care and cultivated as thoroughly as any of the other crops grown at the station. It must be remembered that the season both at the Bellefourche and Akron stations was above the seasonal average, and this fact

Table Showing the Result of Experimental Planting at the Bellefourche Experiment Farm, Bellefourche, S. Dak.

Species	No. of plat	Class of stock	Number planted	Per cent alive	Avg.* height	Length of growing season	Present condition
Cottonwood	1	18-24-in. seedlings	258	71	42 in.	5 months	Very good
Cottonwood	2	18-24-in. seedlings	126	86	42 in.	5 months	Very good
Red Cedar	2	6-8-in. seedlings	126	46	12 in.	5 months	Poor
White Willow	3	24-36-in. rtd. cutting	354	99.9	36 in.	5 months	Very good
White Willow	4	24-36-in. rtd. cutting	189	99.4	36 in.	5 months	Very good
Rus. Golden	4	24-36-in. rtd. cutting	189	99.4	24 in.	5 months	Very good
Black Locust	5	12-18-in. seedlings	281	90	40 in.	5 months	Very good
Green Ash	6	18-24-in. seedlings	352	92	12 in.	5 months	Very good
Honey Locust	7	18-24-in. seedlings	235	85	15 in.	5 months	Good
White Elm	8	18-24-in. seedlings	105	98	18 in.	5 months	Very good
Siberian Pea Tree	9	12-24-in. seedlings	178	96	16 in.	5 months	Good
Russian Wild Olive	9	12-24-in. seedlings	178	93	24 in.	5 months	Very good
Black Hills Spruce	10	4-8-in. transplants	322	70	10 in.	5 months	Good
Australian Pine	11*						
Red Cedar	12	6-8-in. seedlings	405	61	12 in.	5 months	Poor
Scotch Pine	13	4-8-in. transplants	118	71	10 in.	5 months	Good
Total			3,416				

*The average height at end of growing season is less than height of stock at beginning, but is due to the fact that the trees were cut back severely at time of planting.

"It will be noted that the results are exceptionally good and are decidedly better than those obtained at Akron. The better results are probably due to the fact that the plant material was in better condition and perhaps handled more carefully after arriving. Ordinarily, the stand secured is sufficiently satisfactory to dispense with replanting of any of the plots, but it is the intention to replant

must be borne in mind when considering the results of the experiment. However, there is no doubt that tree growing can be made very successful under dry farm conditions if the land owner is led to fully realize that it is absolutely necessary to give the trees as much care as the most valuable crop on his farm."

Railroads to Cooperate in Fire Control

Secretary Wilson has signed a memorandum of agreement with the Great Northern Railway Company, and also one with the Northern Pacific Railway Company, which provides for cooperation of the Forest Service and the railroads to prevent damage to the national forests from fires along all lines operated by these railroads. These agreements had already been signed by R. I.

Farrington, vice-president of the Great Northern, and Howard Elliott, president of the Northern Pacific, so that they are, by the signature of the Secretary of Agriculture, now in force.

The agreements have in view both the reduction to the lowest point of the fire risk from the operation of the railroads and joint action by the Forest Service and the railroads to fight all fires which may start along the lines. The companies agree to clear and

keep clear of inflammable material a strip of varying width, as conditions may demand, up to 200 feet beyond the right of way, and to provide all locomotives which do not burn oil with suitable spark arresters and other standard equipment to prevent the dropping of fire. It is also stipulated that every effort will be made by the companies to operate their locomotives so as not to cause fires. The protective strip is to be designated jointly by representatives of the railroad and the Forest Service.

In fighting fires the railroads and the Forest Service will cooperate closely. Prompt notification to forest officers of all fires discovered by employes of the railroads is provided for. Telephone lines to make this possible will be put up by the Forest Service, using the companies' poles where this is desirable. Warning whistles will be sounded by locomotives on occasion. Forces of fire fighters will be assembled on the outbreak of fires, made up of forest officers, railroad employes, and such temporary labor as can be gathered by either. Except for salaries of regular employes, the cost of fighting fires which start within 200 feet of the railroads will be borne by the companies and of all others by the Forest Service, unless it shall be shown in the first case that the railroads were not responsible or in the second case that they were responsible for the outbreak of the fire.

The agreement provides that the Forest Service will regularly patrol the rights of way during the fire season. The work of clearing the strips satisfactorily, including disposal of all slash and refuse, is to be performed by the railroads under the supervision of the Forest Service.

Grazing Lands in the National Forests

Some of the senators from the Rocky Mountain states frequently and emphatically assert that the people in their states are hostile to the inclusion of so much of the national domain in national forests and represent that this destroys the development of the country and interferes with the rights and opportunities of individuals. Grazing is one of the industries which they assert is seriously injured by a national forest policy. That this is not true is clearly shown by the fact that so many protests have been received by the United States Department of Agriculture against the elimination from national forests of non-timbered lands that are chiefly valuable for grazing, that Secretary Wilson has found it necessary to make a statement in regard to this question, explaining that the department acts under certain limitations in carrying out the intent of existing laws. "Most of the protests," he said, "set forth injuries which may result from unregulated grazing on the land to be eliminated."

We have an example of this in a copy of a petition which was sent some time ago to a western senator by some of his constituents asking that the boundaries of one of the national forests in the northwest be enlarged to include a certain specified area. This petition was signed by a number of ranchmen, most of them small owners. It is the small owners who benefit by the grazing regulations of the national forest and are protected against the oppression of the large ranchmen who gather in the opportunities which are not protected by these regulations.

The department further explains that the lands proposed to be eliminated are neither forested now nor regarded as suitable for the future growing of trees, so that the government has no authority to hold them as part of the national forests, their actual character having been determined.

The policy recently agreed upon by the Secretary of Agriculture and the Secretary of the Interior, and approved by the President, is not an innovation, but is the same policy which has always been applied by the Forest Service in deciding where national boundaries should be drawn. The reason why lands formerly included in national forests are now being eliminated is to be found not in a change of policy, but in the fact that the actual conditions were ascertained last year for the first time through careful boundary examinations.

The evils feared by those who are now making protest against the exclusion of the lands in question are usually of two kinds. In many places, residents find themselves likely to suffer from an invasion of the range by outsiders. If the grazing is uncontrolled, transient stock may not only eat up the forage, but also deplete the range through overgrazing, to the loss and even the eventual ruin of the local stock owners. Although Secretary Wilson recognizes that this may be the case, he has pointed out to those who make this argument that government control of lands valuable only for grazing was not contemplated by the laws authorizing the creation of national forests, except as far as is necessary to secure practical administrative boundaries.

Another ground of protest against the eliminations is that administration by the Department of Agriculture has already resulted in great improvement to the water-flow, or that unregulated grazing will result in polluted streams or serious damage to watersheds. In some cases the increase in water supply which has followed national forest administration is put as high as twenty-five per cent. To those who make this point, Secretary Wilson is replying that every effort has been made to safeguard water supplies; that the eliminations proposed are only along the borders of the forests, and the protection of water-flow is recognized as a legitimate reason for retaining brushland even though it is not likely

is not denied that in some cases the elimination of purely grazing lands may possibly result in a certain amount of stream pollution, but the Department of Agriculture holds it has no authority to try to prevent this

ever to grow timber of commercial value. It through national forest administration of such lands. In the main, it is believed that the interests of water-users have been well cared for in making the eliminations.

STATE WORK

CALIFORNIA

A Plan for State Forests to Protect Irrigation

The orange growers of southern California are becoming alarmed at the rapid destruction of timber, because the cutting away of the timber endangers the water supply. State Forester Homans, in consultation with fruit growers of Orange, Riverside, and San Diego counties, has developed a plan by which the legislature may be asked to appropriate half of the money necessary to buy the forests surrounding the irrigated fruit lands, and the growers furnish the rest, with the understanding that the forests be taken over by the state and maintained as public reserves. Under that plan the state would be getting more than an equitable return for its money, and the land owners would be remunerated through benefits derived by the preservation of water for irrigation.

"Another plan," says Mr. Homans, "is for the fruit growers to buy the timber lands outright and keep them as private property. Also, the legislature could pass a law to stop the cutting of the timber. But the plan which seems to me the most logical one is for the state and the fruit growers to each appropriate enough money to buy the necessary forests and deed them to the state."

Connecticut

The state forester, S. N. Spring, has issued an urgent statement calling attention to the forest fire peril and asking for the cooperation of all citizens in guarding against it.

Reports for 1909 from ninety-four per cent of the towns in the state show the following totals: Three hundred and thirty-six fires burned over 15,000 acres, with an estimated damage of \$27,000. The expense of fighting these fires was approximately \$2,500, of which the towns paid one-half. Six per cent of the towns did not report at all, and it is probable that many other fires occurred which were unreported.

The reports of damage done were also very low, since the loss to future growth and the final crop is difficult to estimate, although very great. The damage was probably at

least a third greater than reported, a total of \$36,000. Many of the fires, through the efforts of the wardens, were confined to small areas, and it is evident that the loss would have been much greater if there had been no organized effort to control and prevent fires.

Of the 336 fires reported, no known cause for nearly one-half, or 159, was given. In many cases it is difficult to determine with certainty how the fire started, especially as the warden's attention must necessarily be directed to putting out a fire in its early stages if possible. Ninety-four fires were attributed to sparks from locomotives, and eighty-three to carelessness of hunters, campers, brush-burners, etc. Doubtless there were many unreported railroad fires, which were put out by section hands and wardens before much damage was done. The fact remains that the railroads are responsible for an unnecessarily large number of forest fires. Greater cooperation of the railroads with forest fire wardens must be secured during the coming season.

In his statement, Mr. Spring summarizes the forest fire laws of the state, and discusses the causes of fires and means of prevention.

Forest Legislation in Maryland

The Maryland legislature has recently enacted into law some recommendations of the state forester amending the present forest laws. The most important features are giving forest wardens the power of arrest without warrant in the case of any violation of the forest laws, the power to summon assistance, and to require the use of teams, tools, etc., in extinguishing forest fires. The new law makes it the duty of any one who sees a forest fire not under control to extinguish it, or to report it to the local forest warden. Failure to discharge this duty is punishable by a fine of \$10.

The apportionment of forest wardens shall not exceed one warden for each 15,000 acres of woodland determined by the survey of the state board of forestry, each warden to be commissioned by the governor on recommendation of the state forester. The mini-

mum pay for wardens has been fixed at \$1.50 for five hours or less and 25 cents per hour thereafter, and the pay of those employed to assist shall be at the rate of \$1 for five hours or less, and 20 cents per hour thereafter. Expenses on account of forest fires are to be borne half by the state and half by the county in which the fires occur. In addition to payment for fire fighting, each warden may receive a salary of \$20 per annum from the forest reserve fund.



Massachusetts

The Massachusetts method of acquiring state forests and at the same time promoting private forestry by taking over through purchase or gift comparatively small tracts of land for reforestation with the privilege secured by law to the owner of repurchasing the property in ten years, paying a moderate percentage to cover the cost of the work of planting and care by the state in the meantime, is progressing slowly but surely. Massachusetts forestry figures look small as compared with those of states of larger area and more scattered population, but it must be remembered that forestry, so far as this state is concerned, will always be intensive. At present nearly 2,000 acres have been taken by the state under this law and are being planted under the direction of the state forester, F. W. Rane. White pine and Norway spruce are very largely used for this purpose. About 500,000 pine seedlings have been imported, and about 1,000,000 pines and Norway spruce have been grown in the nurseries of the state forest service at Amherst and East Sandwich. The tracts included in these 2,000 acres are distributed among about twenty towns in different parts of the state. A large part of the tracts has been turned over to the state without cost. If the former owner does not choose to resume his property at the end of the ten years by paying the required amount to the state, it will become the permanent property of the commonwealth.

The Massachusetts legislature has disposed of most of the tree and forest legislation that was before it at this year's session. An act was passed to lessen the danger of forest fires in the case of Plymouth and Barnstable by prohibiting aliens from entering upon any land in those counties for the purpose of picking flowers or berries or for camping, without first obtaining the written consent of the owner. The pineries in these Cape Cod counties have been subject to continual fires of considerable extent and destructiveness, and this act seeks to diminish one of the frequent causes of these fires.

The town shade tree law of Massachusetts has for many years been the most effective law of the kind in force in any state in the

Union, and by an act of the present legislature the provisions of this law are extended to the cities of the state. Another act called forth by prevalent conditions in the state requires any one wishing to cut a tree near the highway limits to prove that such tree is not within the highway. In the country towns of the state it has heretofore been very difficult to determine whether trees in woodlots bordering a highway were within the highway limits, and therefore under public control or not. This was owing to the fact that most of the country roads are ancient layouts that have not been accurately surveyed.

At the request of the state forester, a law was enacted prohibiting the sending up of fire-balloons of any description and providing a heavy penalty for violation. This was prompted by the fact that forest fires have been traced to the use of these balloons.

A law was also enacted empowering the state forester, with the approval of the governor and counsel, to accept bequests or gifts of land or money on behalf of the state to be used for the purpose of advancing forestry interests.

Another law provided that towns of a valuation of \$1,500,000 or less appropriating money for defense against forest fires will receive in addition from the state an equal amount up to a limit of \$250.

The Massachusetts Forestry Association, after publishing, under the name of *Woodland and Roadside*, a small periodical for eight years, has decided to discontinue it, and the last number was published in May. This bulletin has served a very useful purpose, but the officers of the association believe that the work of the association has now reached such a stage that its purpose can best be carried out by the issuance of special bulletins and circulars from time to time without any regular publication. This makes it eminently desirable that the members of the Massachusetts Forestry Association and others who have received *Woodland and Roadside* in the past should become subscribers for AMERICAN FORESTRY and thereby be able to keep regularly in touch with the progress of the forest movement.



New Hampshire

As a result of the meeting recently held by the New Hampshire Forestry Commission, it is announced by E. C. Hirst, state forester, the large timberland owners of the northern part of the state have subscribed enough to put in operation during the danger season a practicable system of fire protection. The commission has located three stations—on Mount Kearsarge in Conway, Mount Washington, and Mount Rosebrook—but these are inadequate to cover the north

country and the funds provided by the legislature would not do any more, so the plan of cooperation with large owners was adopted.

The system used will be that which has proved effective in Maine and New York. Mountaintops will be used as lookout stations and telephone lines built, so that a man on the lookout may notify a firewarden or the nearest inhabitant as soon as a fire is discovered. Lookout men will be kept on duty at all times when there is danger of fires, and if enough financial support is secured patrols will be started along the most frequented trails and camp sites during times of drought.

The mountains to be used as lookouts are Mount Pisgah, overlooking the Connecticut lake region and the Magalloway Basin; Dixville Peak, near "The Balsams;" Signal Mountain in Millsfield, Percy Peaks in Stratford, Bald Cap in Success, Mount Agassiz in Bethlehem, Mount Bond in Lincoln, Mount Moosilauke, Mount Chocorua, and Mount Carrigan. These, with the lookouts on Mount Rosebrook, near the Mount Pleasant Hotel; Mount Kearsarge, and Mount Washington, will bring the number up to fourteen.

Lookout men are already at work on several of these mountains, and construction work is being rapidly pushed on others. It is estimated that six more lookouts would cover the mountain region of the state very thoroughly, and these will be built as soon as contributions are made.

NEW YORK

Pettis Succeeds Cary

The resignation is announced of Austin Cary as superintendent of state forests of New York. Clifford R. Pettis, state forester, has been appointed to succeed Mr. Cary. The latter was appointed less than a year ago to succeed the late Col. William F. Fox, who had been superintendent since the creation of the office. Mr. Cary resigned because of ill health, which seriously interfered with his work.

The *Albany Argus* says that there has been some criticism of Mr. Cary's administration, on the ground that he is too much of a theorist. The critics must have been misled by the title of professor, acquired by Mr. Cary in the Harvard University forestry department, for the most of his professional career has been spent in the woods in the service of great lumber companies, and he is one of the most experienced practical foresters in America and a man of good judgment and sound sense.

Mr. Pettis lives at Clear Lake Junction, in the Adirondacks country, and is an experienced forester. He served eight years under Colonel Fox and has been very successful in his management of the state nurseries.

PENNSYLVANIA

Another Instance of Private Forestry

As a practical example in private forestry, Lewis K. Stubbs, who owns a fine farm in southern Lancaster County, Pennsylvania, in the beautiful hill land bordering the Susquehanna River, has just finished planting 3,000 red oak seedlings, writes W. F. McSparran, in the *Tribune Farmer*.

Mr. Warfield, of the state forestry department, superintended and directed the planting, which was done on a rather steep and rocky hillside that had been for many years past devoted to pasture and is well set in native wild grasses, more valuable for soil enrichment than animal nutrition.

The method of planting the seedlings was to dig a small hole with a mattock, and, placing the tree root against the solid side of the hole, draw in the soil and ram tightly against the tree. The holes were dug from six by six to four by five feet, endeavor being made to maintain general straight rows, but no time being lost in alignment, the general object being to demonstrate that reforestation can be done cheaply and rapidly.

Mr. Stubbs had the seedlings shipped from a middle-west nursery. They cost him about \$6 a thousand, and he hopes to prove by this initial planting that he can thus materially improve the value of a not very productive hillside. He hopes, also, to stimulate a local interest in tree planting for the private land owner who may have hillside or other lands that may be more desirable for profitable tree growing than for cultivation in farm crops.

Forest Taxation in Wisconsin

The United States Forest Service is making a cooperative study, with the Wisconsin State Board of Forestry, of forest taxation in that state. The plan of the study is outlined as follows:

The purpose of this investigation is to obtain the information from which conclusions may be drawn as to whether or not the present method of taxing forests is satisfactory or not; and, if not, what the evil features are, and how the taxation of forests may be placed on a satisfactory basis. For this purpose information is required upon the following topics:

1. The actual burden of taxation on forests, at the present time, and also in the past so far as possible. Also whether forests are taxed more or less heavily than agricultural and other lands. For this purpose it is necessary to ascertain:

i. The total valuation of all property, real and personal, in each town and county of the state; the assessed valuations and true values, so far as possible, of forests, waste

lands, and, for the sake of comparison, of agricultural lands, in the several parts of the state. Also the prevailing ratio of assessed valuation to true value. Also the tax rates for every town and county of the state.

2. Detailed facts about as many particular cases as possible where the relation between assessed and true value and the actual burden of taxation can be accurately determined.

3. Impressions and opinions of all persons, officials, timber owners, and others who are able to speak with authority.

II. *The administration of the general property tax in the case of forests.* The method of assessing forests. How does it compare with the assessment of agricultural lands, etc.? Is the law strictly or laxly enforced? Is enforcement becoming more or less strict?

III. *The importance of the revenue derived from taxes on forests.* How large a part of the revenue of each town and county comes from taxes on timberlands? For this purpose we should know the assessed value of forests in each town and county. Assessed value of waste lands should also be determined if possible. This question will undoubtedly be hard to answer; in many cases it will be impossible to get the information required. However, anything that can be obtained along this line will be of great value.

IV. *The effects of taxation on forests; on the management of forest properties; on the cutting of timber; on the use of cut-over*

lands, etc. Has taxation hastened cutting? Has it led to wasteful cutting or "skinning"? Has it led to abandonment of cut-over lands? Has it prevented reforestation of cut-over lands or the practice of conservative lumbering, etc.? What has happened in the past? What is the present condition? Are there any indications of probable future effects?

V. *The general attitude of people toward the subject:*

1. Is there discontent and complaint of excessive taxation of forests? Is there complaint that forests do not bear their fair share of taxes? Or is there general satisfaction with the taxation of forests? Or is the subject not considered of importance?

2. Are plans of reform being discussed? If so, what; and by what arguments are they supported and opposed?

3. Information is especially desired as to (1) how the plan of a single tax on yield when cut would be received, and (2) how people would regard the plan to separate trees and lands, taxing the former on the yield, and taxing the latter annually on its value as waste land or bare land, or at the lowest value at which any land is assessed in the district.

VII. *For aid in answering all of the above questions,* general information is needed as to the amount and character of forests and of waste lands in different parts of the state, the ownership of such lands, and the uses being made of them.

LUMBERMEN AND LUMBER JOURNALS

National Slack Cooperage Association

The National Slack Cooperage Association met in Cincinnati the 17th and 18th of May. William L. Hall, assistant forester of the United States Forest Service, was the principal speaker on the closing day. The following officers were elected: President, George T. Pettibone, Louisiana, Mo.; vice-president, A. B. Struthers, Romeo, Mich.; secretary and treasurer, J. S. Palmer, Sebawing, Mich.; directors, James Innes, Chatham, Ont.; W. K. Jackson, Buffalo, N. Y.; J. T. Wylie, Saginaw, Mich.; R. Mittelbuscher, Davenport, Iowa; C. E. Chittenden, Ashley, Mich., and N. V. Turner, Malden, Mo. Chicago was chosen for the next convention, on the second Tuesday and Wednesday of November. Among resolutions adopted was the following:

"We believe that the nation should exercise its constitutional power for the general welfare in disposing and regulating the public domain; that no license or grant of water-power or power sites should be made which

does not safeguard the public interests by requirement of reasonable prompt development on pain of forfeiture; payment of a fair compensation periodically adjusted; the limitation of the grant to a term of fifty years; the right of the government to make reasonable regulations as to rates of service, and the provision for inspection and publicity of records and accounts.

"That the government should retain title to all lands still in public ownership which contain phosphate rock, coal, oil, or natural gas, and that the development of same should be made under the same conditions and regulations as will prevent extortion and waste.

"That the nation and several states should enact effective laws to prevent the spreading of fire in all forests, whether publicly or privately owned.

"That the conservation of our natural resources is of such great importance that the subject should at all times engage the attention of the nation, the states, and the people in earnest cooperation, in order that the foundations of our prosperity may be conserved."

The Endowment Completed

At the recent meeting of the National Lumber Manufacturers' Association, the endowment of the chair of lumbering at the Yale Forest School, undertaken five years ago, was completed. Mr. Rhodes reported that \$66,246.20 had been paid in, and that the Weyerhaeuser interests had pledged \$10,000 if the balance was raised among the lumbermen of the country. The yellow pine manufacturers pledged \$10,000, and before the close of the meeting the balance was secured, making the amount slightly in excess of the required \$100,000. It was reported that Mrs. Sage and Andrew Carnegie would each give \$100,000 if the lumbermen raised their amount.

The following officers of the association were elected: President, Edward Hines, of Chicago; vice-presidents, Everett Griggs, of Tacoma, Wash.; William Stillwell, Savannah, Ga.; R. H. Downman, New Orleans, La.; R. H. Vansant, Ashland, Ky.; secretary, George K. Smith, St. Louis, Mo.; treasurer, J. A. Freeman, St. Louis, Mo.; manager, Leonard Bronson, Chicago, Ill.; board of governors, William Irvine, W. C. Langdon, F. H. Pardoe, J. B. White, E. C. Fosburgh, F. E. Weyman, R. M. Carrier, W. C. Meyers, J. H. Bloedel, A. T. Gerrans, William Dreary, Lloyd J. Wentworth, C. A. Bigelow.

The association includes the following affiliated organizations:

Association	Membership	Output, 1909
Southern Cypress Manufacturers' Association.....	52	445,000,000
Michigan Hardwood Manufacturers' Association.....	70	319,000,000
North Carolina Pine Association.....	71	664,000,000
Wisconsin Hardwood Manufacturers' Association.....	36	100,000,000
No. Hem. and Hardwood Manufacturers' Association.....	60	550,000,000
Western Pine Manufacturers' Association.....	84	874,000,000
Northern Pine Manufacturers' Association.....	50	1,419,000,000
Southwest Washington Manufacturers' Association.....	28	200,000,000
Pacific Coast Lumber Manufacturers' Association.....	165	3,000,000,000
Yellow Pine Manufacturers' Association.....	275	3,649,000,000
Oregon and Washington Lumber Manufacturers' Association.....	105	800,000,000
Hardwood Manufacturers' Association of United States.....	272	600,000,000
Georgia-Florida Sawmill Association.....	76	800,000,000
	1,344	13,420,000,000

Practical Reforestation Work

The *Paper Trade Journal* gives this account of the practical reforestation work of the West Virginia Pulp and Paper Company:

"The company owns practically the entire Cheat Mountain Valley, near Cass, W. Va., the holdings starting at the sources of the river and continuing down the main stream a distance of probably thirty-five miles, an aggregate of about 100,000 acres of virgin spruce forest. The spruce of that section is of exceptionally fine quality and the stand is very heavy. S. E. Slaymaker, of New York city, who is at the head of the lumber department, is an altruistic man. His conscience bothers him when he thinks about the havoc his several hundred woodsmen make in the forest every year, and it has been troubling him so greatly that he has devised a practical scheme for replacing the timber. This tract was examined by experts of the government several years ago, and a plan was suggested for replanting with small trees to be shipped in from a distance. Instead of following this plan, those in charge of the work devised one of their own. In certain valleys conditions are ideal for the propagation of an overabundant growth. The surplus plants are taken out of the ground in the afternoon and are replanted the next morning. The company has set out 25,000 spruce

trees during 1909, of which eighty per cent are said to be thriving, and this spring the company has planted 109,000 spruce trees, also 10,000 to 12,000 young poplars, and expects to put in about 60,000 additional, and hereafter at the rate of about 100,000 trees a year. Another practical feature of the operation at that point is the precaution taken to prevent the inception and spread of fire. A space of fifty to 100 feet is cleared along every logging road and spur. During the dry seasons every locomotive is followed by a ranger, who stamps out small leaf-fires which originate in its wake. During the ten years in which this company has operated only a little more than 1,000 acres have been burned over, and this was cut-over land. The officers of the company deem it just as important to keep the fire out of cut-over land as out of timber, and are guarding the preserves in such a manner as to insure practically a continuous supply of saw logs and pulp wood.

Minnesota Lumber

Lumbermen estimate that of the 1,000,000,000 feet of Norway and white pine cut in northern Minnesota last winter, at least twenty-five per cent and possibly thirty-five per cent, is still in the woods and cannot be

moved until next winter. This twenty-five per cent to thirty-five per cent represents approximately the profit margin of the winter's cut, and the impossibility of getting it to the mills may affect prices, though competition from the west and south, which is growing stronger, may make it unavoidable for the Minnesota lumbermen to ask more for their product. As the result of this tie-up in the woods, many of the sawmills of the state, especially those on the lower Mississippi, will be unable to operate, and sawmill labor will be cheapened for such mills as are able to run on full or part time. Several of the larger mills in Minneapolis which usually begin sawing about May 1, will not open until June 1, and will run only on half time from that. The Minnesota lumbermen are in a peculiar position in the market. The overproduction of yellow pine in the south is seeking a market in the north; the west stands ready to flood Minnesota markets with high-grade Washington and Oregon fir—more than enough to meet any deficiency in the home market. The season's cut of Norway and white pine will bring almost any price that the lumbermen care to ask, but at the present time they want to discourage rather than encourage competition. In this cement plays an important part. Lumbermen are noting with more or less alarm the advance that cement is making as a cheap and efficient substitute for pine, and they realize that a raise in prices now will give the cement manufacturers an advantage which it would later be hard to overcome.—*Pioneer Western Lumberman.*

The Question of Coercion

The recent decision of the United States supreme court in the Mississippi association case has a far-reaching significance. It marks the passing of the idea of coercion. That policy was long since abandoned by practically all lumber associations as ineffective. Years ago many of the associations by force sought to prevent competition, to control prices, or to regulate the trade.

Retail associations found that to boycott manufacturers or wholesalers was a difficult and even dangerous undertaking, and most of them long since contented themselves with promulgating the facts, leaving sales to consumers by the wholesaler and manufacturer a matter of conscience and policy. Manufacturers have learned the futility of agreements, "gentlemanly" or otherwise. More conservative ideas have been indorsed and these more effectually than any court decision have put an end to attempts at coercion.

In the affairs of the Mississippi-Louisiana association the court decision will have an important effect. In the affairs of most of the other associations it will have no effect at all, because such a decision long had been anticipated by most of them.

It is always a question in the minds of many association men whether coercion can be permanently successful. Such men believe that the most an association can do is to establish a principle and leave it to the individual to follow his own judgment.

The conviction is growing in all departments of trade that more is accomplished by the "get-together" spirit than by alignment in battle array. Men are endeavoring to enforce their rights by logic rather than by coercion. They are endeavoring to secure their rights by education rather than by recourse to force. Experience has demonstrated that the man or the association that goes about with a chip on the shoulder and looking for trouble produces bitterness and disputes that make the settlement of mooted questions more difficult instead of more easy. The days of passion are passed. The time of cooperation, arbitration, and calm consideration of disputed rights has come in its stead. It may be that the man who deliberately disregards the rights of others may not yield to persuasion or logic; but, if he is thus set in his ways, there is no reason to suppose that he can be forced to be good. He is an extreme type, no matter on which side of the controversy he is aligned. A larger class are those who commit error rather than wrong. This larger class may be antagonized by force. It can be converted by reason.—*American Lumberman.*

Utilizing Hardwood Timber

Manufacturers of southern hardwoods might well take a leaf from the experience of northern pine operators. At some of the largest and most modern plants in Wisconsin and Minnesota a system of economy is employed that goes far toward proving that practical conservation comes from utilization. Dead and down timber and short top logs are sent to the mill. These are thrown on to the carriage, split, and transferred to horizontal band resaws. There they are sliced into boards, passed to the edger, thence to the trimmer, and out into the yard. At some points the mills are turning out sizes ranging from one by three, two feet long, to heavy timbers.

If an attempt were made to apply this system to southern hardwood plants, the first step would be in the woods. How many manufacturers have ridden through their cut-over lands and found in the top of a tree a clear piece of timber anywhere from three to ten feet long, or found that the loggers left a good stick four to six feet long rather than cut an unusually long-length log?

Those portions of southern hardwood timber growing between clumps of limbs usually are absolutely sound and free from defect. Many trees fork after the first limbs are reached, and on some of the forks can be found a stretch of trunk eight to sixteen

inches in diameter absolutely free from visible defect. Would it not pay to make an effort to utilize such stock?

Such blocks or logs are well adapted to the manufacture of dimension stock. They could be split on the main saw and transferred to a resaw, then run through the edgers or, if deemed advisable, transferred to the department where dimension stock is cut. This should make it possible to utilize the product closely and to produce high-grade dimension without interfering with the usual cut of the mill. It would require only a few seconds for the bandsaw to split a block or log and the halves could be handled with great dispatch in the resaw. Of course, if an upright resaw be used, it would be advisable to slab both sides of the log.

The only question involved is whether or not it would be profitable to develop this phase of the hardwood trade of the South. The field is practically illimitable. In addition to oak dimension, shooks could be cut from cotton-wood and red gum blocks, handles and small dimension stock from ash and hickory, table and chair dimension stock from oak, washing machines and similar material from cypress, and like classes of material from other kinds of wood.

So far as the *American Lumberman* is aware, the idea never has been applied, but it would seem possible to do so with excellent results, increase the productivity of the timber owned, prolong the life of the mill, and swell the income greatly.—*American Lumberman*.

NEWS AND NOTES

CANADIAN CONDITIONS

Consul Van Sant Gives Some Facts in Regard to Lumbering and Forestry

Referring to recent discussions of Canadian forestry and to the attention that is being directed to the subject by our neighbors across the border, Howard D. Van Sant, United States consul at Kingston, Ontario, is quoted as making the following interesting statement in regard to Canadian forest resources:

"The area of the merchantable forests of Canada has been very much overestimated. Estimates of the forest area vary from 200,000,000 to 600,000,000 acres, the timber belt stretching from Ungava across northern Quebec and Ontario, and thence north of the prairies to the Peace River country, but the larger portion of this is not merchantable except for firewood, and cannot be transported long distances. The area of merchantable timber is estimated by some authorities at 100,000,000 acres. The secretary of the Forestry association stated that the amount of Canada's merchantable timber was one-third that of the United States, a liberal estimate placing the available supply at 532,000,000,000 feet board-measure. A recent Ontario estimate was to the effect that the timber, used at the present rate, will last the province thirty years.

"In Ontario the last annual return of revenue was \$2,082,878. The only reason given that Ontario has not had to resort to direct taxation is because the revenue of her crown lands has been sufficient to meet this need. The annual revenue of Ontario from these crown lands amounts to about \$1 per capita.

The total revenue from forest lands held by the Dominion is, in round numbers, \$4,500,000, which all goes to reduce taxes.

"Besides these revenues, the total exports of lumber, timber, pulp wood, and firewood in the last fiscal year, for which returns are available, was \$44,507,528. The home consumption is estimated at \$50,000,000 per year and constantly increasing.

"The value of pulp wood exported in 1890 was \$168,180, while in 1908 it had increased to \$4,037,852, the United States taking \$3,545,530 and Great Britain \$385,199 worth.

"In manufactured wood products the trade with the United States from 1886 to 1908 has increased from \$7,842,526 to \$27,470,574, and with Great Britain during the same period the trade has increased from \$9,354,244 to \$11,843,094, while the total export from Canada during this time has increased from \$18,742,625 to \$44,170,470. In 1908 the total exports of wood products increased to \$49,168,535.

"There is importation of forest products into Canada, principally from the United States, and the value of these imports has increased from \$2,412,572 in 1874 to \$12,032,595 in 1908. For the ten years—1897 to 1906, inclusive—the total imports amounted to \$59,934,770, of which \$57,520,731 was imported from the United States. In 1905 the import of pine alone from Minnesota and Wisconsin was 125,000,000 feet, board-measure, largely to the western prairie provinces. In the other provinces the imports are mostly of hardwood, such as oak, ash, walnut, hickory, and cherry.

"It is claimed that over 8,000,000 acres of waste land in Ontario could be managed for forest crops. There are also over 200,000

acres of sand lands, a large portion of which was formerly farm lands that have been sanded over because of the ruthless destruction of trees. It was shown that the destruction of these forests had also caused a commensurable loss of water-power because the snows of winter and the rains of spring and autumn hold back in an even flow the water fed to the brooks and streams.

"Considerable portions of the waste-sand area in Ontario are being replanted in plats of 100 acres or more at a season, under the direction of the Canadian Forestry Association, and in almost every instance the most barren wastes are beginning to show surprisingly satisfactory results in reforestation. In the prairie provinces, where the soil is richer, the young tree planting has met with even better returns.

"The southern part of the Kingston district the writer has found practically denuded of its best timber, especially along and near the shores of the St. Lawrence River and Lake Ontario. Firewood is selling in Kingston at from \$6.50 to \$7.50 per cord, as compared with half these prices a few years ago.

"On Amherst Island, one of the most beautiful and fertile islands in the district, containing some 13,000 acres, more than 5,000 acres of valuable large and straight white oak, pine, hickory, maple, and basswood timber have been cut and carried away without regard for conservation, so now there are not 100 acres of timberland on the entire island. The population of the island has decreased from 1,300 to 800 since this timber cutting ended, and those remaining are burning fence rails for fuel, or are paying higher prices for coal brought in vessels during the open season. Wood is at a premium and the price is constantly increasing."

The Glacier National Park

The President, on the 12th of May, signed the bill creating the Glacier National Park in the wild, scenic region on the Continental divide. The Canada line is the northern boundary of the park, which extends from the Flathead Valley on the west to the Blackfeet Indian reservation on the east. *Forest and Stream*, which has been the project's strongest advocate, says of it:

"Beautiful to the eye as is the Glacier Park, stupendous as are its mountains and wonderful as are its lakes, snowfields, and glaciers, the park has another value and another beauty quite apart from this. The abundance and variety of game indigenous to its rough mountains is noteworthy. Formerly it was a great range for bison, the dark timber-inhabiting animals, of which a few yet linger in the Yellowstone National Park.

Some moose still inhabit the thick timber of the Glacier Park's mountain slopes, where there are also a very few elk, some mule deer, and some whitetail deer. Black and grizzly bears, and their signs, are seen from time to time. The great importance of the region, however, is as a range for mountain sheep and for white Rocky Mountain goats. In this park there are probably more wild sheep than in any equal area in the United States, and in some sections white goats are very abundant. Only a few years ago some travelers counted at a single view several little bunches of goats—forty in all—feeding in a valley below the snow line near Iceberg Lake.

"With protection and the introduction of a few buffalo, the Glacier Park will become a wonderful preserve for the perpetuation of many forms of the large animal life in North America."

State Must Aid Reforestation

The editor of the *Duluth News Tribune* has his own ideas about what should be done to renew the forest growth of the state. He would let the remaining trees do the reforesting and have the state devote its energy to protecting the new growth. This will do where there are some remaining trees to start things. Where they have been cleaned up altogether the seedlings or the seeds must be furnished by the aid of the state.—*Mississippi Valley Lumberman*.

The Demand for Cypress

Cypress dealers note an increasing demand for cypress in northern markets, where white pine and other native woods have held the field. The claim is made that cypress has been selling, comparatively speaking, much below its intrinsic value, and that the increasing demand will bring about a rise in price.

The Great User of Mahogany

The United States is the greatest user of mahogany, and about seventy-five per cent of the world's output is marketed here. Our mahogany supply comes chiefly from Africa, through Liverpool, where it is sold at periodical auctions. The American dealers, being the heaviest buyers, get the best. Shortage and the increasing demand have pushed prices at present to the highest point known.

